

THE AUK:

A QUARTERLY JOURNAL OF

ORNITHOLOGY.

VOL. XXX.

OCTOBER, 1913.

No. 4

A BIOLOGICAL RECONNAISSANCE OF OKEFINOKEE SWAMP: THE BIRDS.

Plates XIV-XX.

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THE famous Okefinokee, 'the greatest natural wonder' of Georgia, and 'one of the least known areas of its size in the eastern United States,' covers parts of Charlton, Ware, Clinch, and Pierce Counties, and extends a little beyond the Florida line. It is about 39 miles in greatest length by 26 miles in greatest width, and occupies some 660 square miles. Among the fresh-water swamps east of the Mississippi, it is exceeded in size only by the Everglades; and in the richness of its historical and literary associations, in its diversified topography, in the marvelous beauty and charm of its interior, and in its extraordinary interest as a faunal and floral area, Okefinokee Swamp is unique.

HISTORY.

A volume might be written concerning the history of the Okefinokee, of which we shall give here only the briefest abstract. From very early times this swamp has been the subject of strange legends and fanciful speculation. As long ago as 1682 it appeared on a map¹ as a 'Lacus Mag[nus]' at the source of the St. Mary's River (Rio de May), and in 1776 it was represented² as the 'Great

¹ Winsor, J. Narr. & Crit. Hist. America. Vol. IV, 1884, p. 227.

² The American Military Atlas, 1776, Map 5.

Swamp Owaquaphenoga,' its boundaries reaching almost to the Flint River. This was the heart of the country of the Lower Creeks and Seminoles, who enshrouded the swamp with mystery and peopled it with an immortal race which neither they nor the Spaniards could conquer. In Bartram's well-known account¹ of this pleasing legend, one of the islands in the swamp is represented as 'a most blissful spot of the earth; . . . it is inhabited by a peculiar race of Indians, whose women are incomparably beautiful,' and are called 'daughters of the sun.'

The Okefinokee has repeatedly served as a refuge for non-combatants or the weaker side in wars. During the Revolution some Indians who were unwilling to take part in the war settled here. In the Seminole or Florida War it proved an almost impregnable fastness for the Creeks and Seminoles. At this period a number of the places in the swamp and its vicinity received their present names, e. g., Billy's Island and Billy's Lake (after Billy Bowlegs, a Seminole chief), and Floyd's Island (after Gen. John Floyd, who dislodged some Indians from this island). In the Civil War Confederate deserters sought its protection, and even to-day miscreants flee here to evade the arm of justice.

The swamp has been the subject of untold memorials and petitions on behalf of the legislatures and the officials of Florida and Georgia. In 1800 the first good boundary line between these two states was established by Ellicott, and his famous mound in the southeastern corner of the swamp is not yet entirely obliterated. In 1829, in 1850 (approximately), and finally in 1879, the Okefinokee commanded attention because of a projected ship canal connecting the Atlantic Ocean with the Gulf. At the last date a careful survey of its confines was made for the federal government. It was proposed to send feeders for the canal into the swamp, and the canal itself was to pierce its southern part.

Of drainage investigations and commercial operations in the swamp, a few excerpts from McCallie's 'Drainage Situation in Georgia'² will suffice to furnish an account. He speaks first of 'Col. R. L. Hunter's survey of the Okefinokee Swamp, made in 1856-7 . . . , with a view of ascertaining the practicability of its

¹ Bartram, Wm. *Travels, etc.* Phila., 1791, p. 25.

² McCallie, S. W. *Bull. 25, Geol. Survey of Ga.*, 1911, pp. 14-18.

drainage, the cost of the same, etc. . . . There was furnished to the Governor a map of the swamp, with the elevation around the whole swamp and lines of ditches, which it was estimated would drain the swamp at a cost of \$1,067,250. . . .

'On November 4, 1875, by direction of Governor J. M. Smith, the party of the Geological Survey operating in Southern Georgia joined the "Constitution Expedition," organized by the proprietors of the paper of that name in Atlanta, and remained until December 14th. A line of levels was run by Mr. C. A. Locke, engineer of the "survey," from Mixon's Ferry on Suwanee River to Trader's Hill on St. Mary's, . . .

'In 1889, the Okefinokee Swamp, or that part of it owned by the state of Georgia, comprising an area of 380 square miles, was purchased by the Suwanee Canal Company at 26½ cents per acre. The object of this company in acquiring the swamp was, first, to utilize the timber which was known to exist therein in large quantities, and subsequently to drain the swamp and use the lands for agricultural purposes. With these objects in view, the canal company began, in September, 1891, the construction of a canal from St. Mary's River to the swamp, a distance of about six miles. Later this canal, which was 45 feet wide and six feet deep, was continued into the swamp for something like 12 miles. . . . The Suwanee Canal Company, under the presidency of Captain Henry Jackson, of Atlanta, was successful in winning a large amount of cypress and other timber from the eastern side of the swamp, but operations were discontinued before the canal was sufficiently completed to have but little effect in draining the swamp as a whole. The large holdings of the Suwanee Canal Company have, within the last two or three years, been acquired by the Hebard Lumber Company, which is at present engaged in cutting and preparing for market the timber in the large cypress forest on the northwestern margin of the swamp.'

Few men of scientific interests or training have ever entered the swamp, and still fewer have traversed or explored any considerable part of it. Paul Fountain, in his 'Great Deserts and Forests of North America,' speaks of visiting it in 1871 and 1876, but his description is so far from what would be expected of one who had been in the interior, that it is extremely doubtful if he saw more than the borders of the swamp.

Doubtless the first ornithologist to see the real Okefinokee was Mr. C. F. Batchelder, who, about twenty-five years ago, entered on the eastern side and went as far as Black Jack Island, where he remained a day or two.

Maurice Thompson's writings contain some interesting references to the Okefinokee. His observations on the nesting of the Ivory-billed Woodpecker, so delightfully described in 'A Red-headed Family,'¹ were made 'in one of those shallow cypress lakes of which the larger part of the Okefinokee region is formed'; and he remarks further that 'Near by, to the westward, lay one of those great gloomy swamps, so common in southeastern Georgia, so repellant and yet so fascinating, so full of interest to the naturalist, and yet so little explored.' What appear to have been later experiences with the Ivorybill in the same locality are recounted in 'An Archer's Sojourn in the Okefinokee.'² In this paper, however, he states that his *locus* was exactly twenty miles southeast from Blackshear, Ga., on a branch of the Satilla; and this places it in or near an area sometimes known as Little Okefinokee Swamp, which is entirely separate from the real Okefinokee, and miles distant from it. In 'My Winter Garden,'³ also, Thompson speaks casually of having been 'deep in the Okefinokee'; and yet it is almost inconceivable that he could have seen for himself the marvels of the swamp's interior without treating them extensively with his gifted pen.

In August, 1902, R. M. Harper and P. L. Ricker spent two days in the swamp, devoting their attention chiefly to botanical exploration. They traversed the whole length of the canal and made a side trip to Bugaboo Island. The former has published the most complete account⁴ of the swamp that has yet appeared. Not only this article but also Dr. Harper's notes on the plants have helped us in the preparation of the present paper.

Prof. Albert M. Reese, while studying the breeding habits of the alligator, visited the Okefinokee in the summers of 1905 and 1906, on the second occasion 'penetrating the swamp to its centre.'⁵

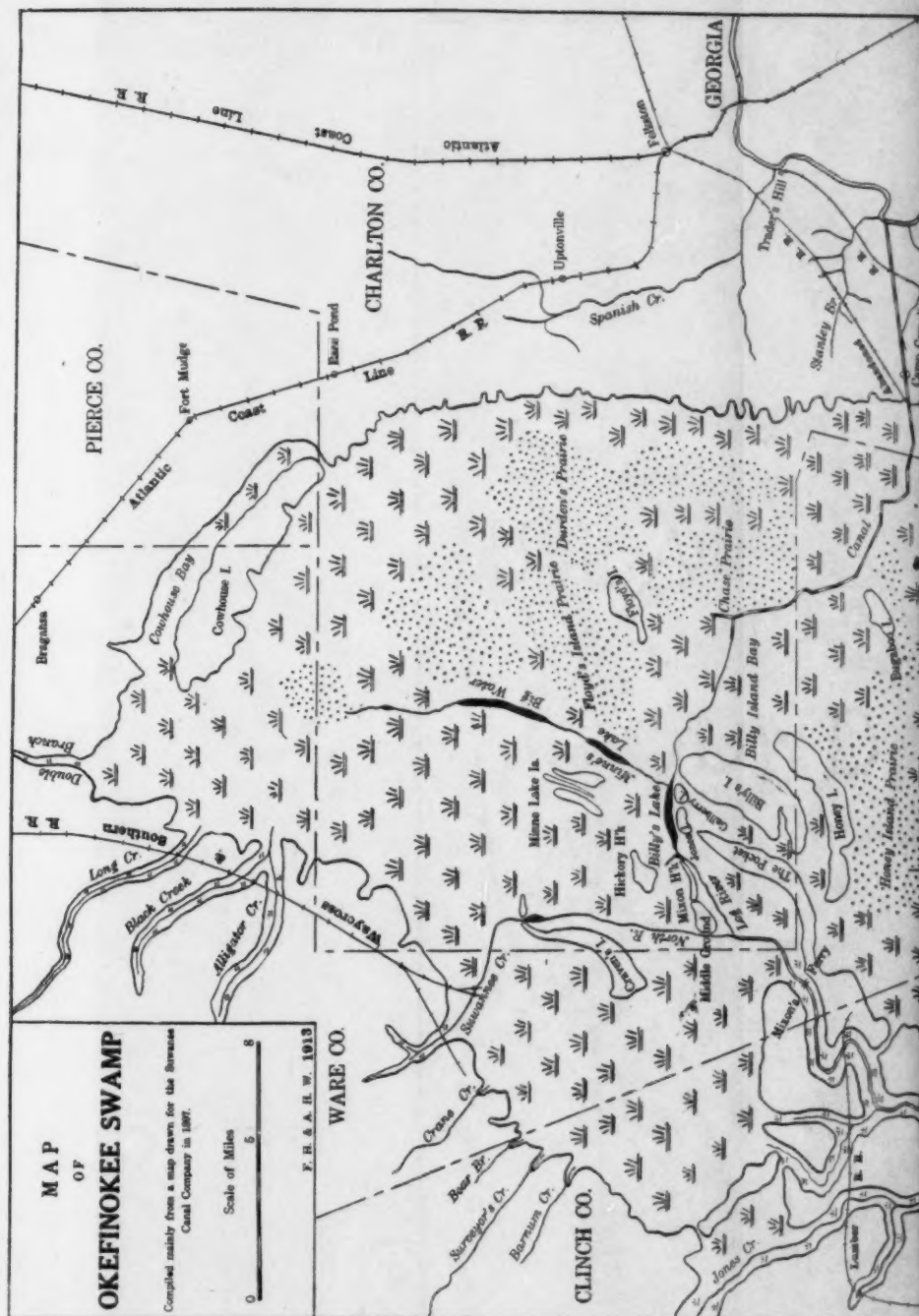
¹ Thompson, Maurice. *By-ways and Bird Notes*. New York, 1885, pp. 23-39.

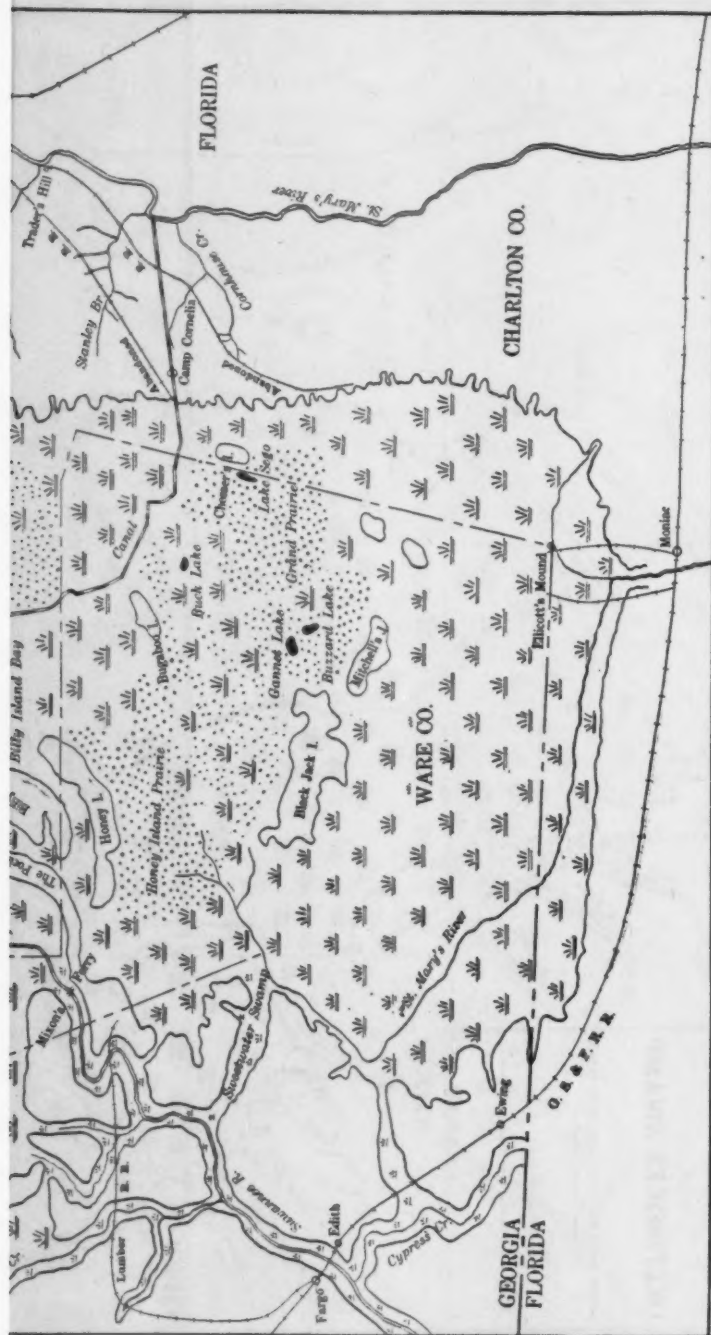
² ——— *Atlantic Monthly*, LXXVII, April, 1896, pp. 486-491.

³ ——— *My Winter Garden*. New York, 1900, p. 222.

⁴ Harper, R. M. *Okefinokee Swamp*. *Popular Science Monthly*, LXXIV, June, 1909, pp. 596-614.

⁵ Reese, A. M., Smith. *Misc. Colls.*, XLVIII, 1907, Quart. Issue, Vol. III, Part 4, pp. 381, 382.





The Soil Survey of the Waycross Area, published by the U. S. Department of Agriculture in April, 1907, contains a fairly good description of the northern end of the swamp.

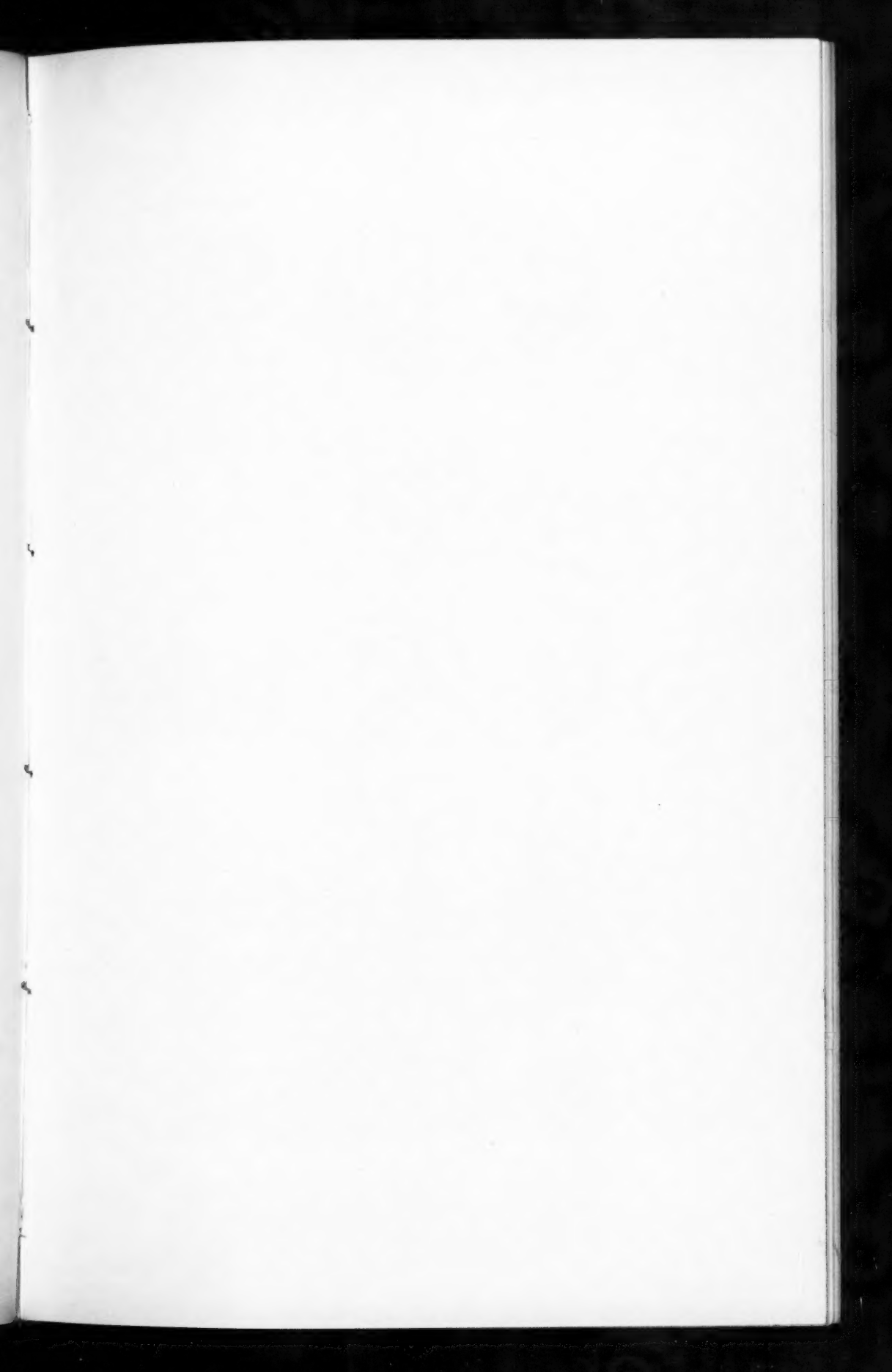
Prof. J. M. Reade, of the University of Georgia, and Mr. Huron Smith, of the Field Museum of Natural History, both Cornellians, entered the swamp by way of the canal in December, 1909, and made botanical investigations during a stay of a week.

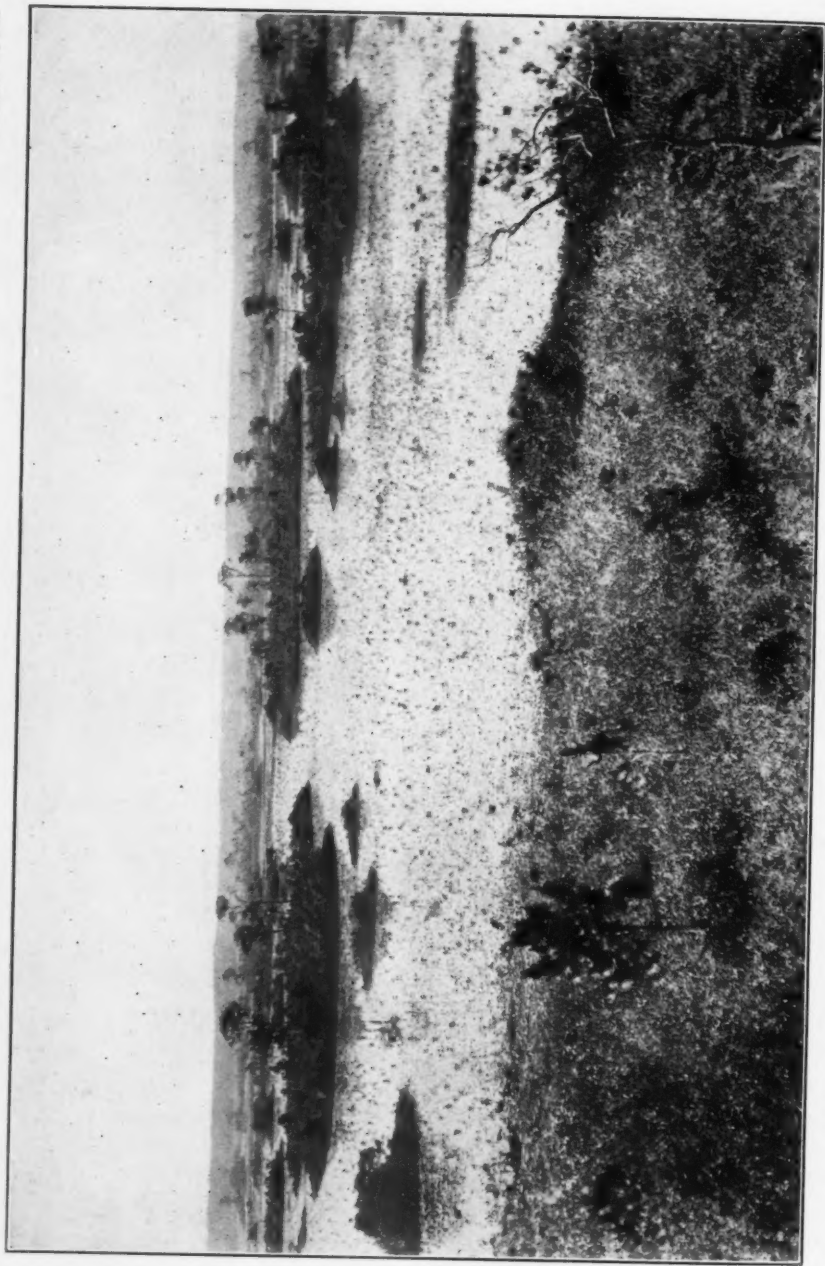
Our own observations covered most of the period from May 6 to July 13, 1912. On the first-mentioned date Harper, with David Lee as guide, entered the swamp by way of Suwannee Creek on the northwestern side, but finding the route practically impassable after the first few miles, they made a detour through Waycross and Braganza to the northeastern side. Setting out again by boat from Cowhouse Island on the morning of May 8, they reached Billy's Island that night, meanwhile having passed through the Big Water, Minne's Lake, and the eastern end of Billy's Lake. During the next fortnight, with Billy's Island as a starting point, trips were made to Mixon's Hammock, Honey Island, the canal and Chase Prairie, Floyd's Island Prairie, and Floyd's Island. An effort to reach the Minne Lake Islands was also made, but failed. On May 23 they departed from the swamp, as they had entered, by way of Cowhouse Island.

On May 28 the Cornell University Expedition proceeded from Fargo on the southwestern side of the swamp. The party included Professors J. C. Bradley and C. R. Crosby, of the Dept. of Entomology, Dr. A. H. Wright, of the Dept. of Zoölogy, S. C. Bishop and M. D. Leonard of the class of 1913, Headmaster W. D. Funkhouser of the Ithaca High School, and Paul Battle, of Bainbridge, Ga. Mr. E. L. Worsham, State Entomologist of Georgia, and Mr. C. S. Spooner, Asst. State Entomologist, accompanied the party during the first week, and to them we are indebted for several favors. Professor Bradley had made previously (1909, 1910, and 1911) brief reconnaissances on the eastern (Suwannee Canal) and northwestern (Suwannee Creek) borders of the Okefinokee. From Fargo, the party was transported on a lumber tramway to a point about two miles from Mixon's Ferry. Thereupon, with guides whom Mr. R. W. Bennett, of the Fargo Land Company, had kindly secured for us, we began a walk of ten or twelve miles over corduroy

roads, sometimes waist-deep, to Billy's Island, where camp headquarters were established. The route from Fargo to the camp, by way of Mixon's Ferry, the Pocket, Jones Island, and Gallberry Island, was frequently traversed. Billy's Island, Billy's Lake, and Mixon's Hammock were quite thoroughly explored. Honey Island, Honey Island Prairie, Floyd's Island Prairie, and Floyd's Island were visited for periods covering from one to three days. A special trip was made to a heronry between Fargo and Mixon's Ferry. Two attempts were made to reach the Minne Lake Islands, the first from Minne's Lake due west, and the second from Billy's Lake due north. The entire party was successful in making the second trip. On July 13 we left the swamp, coming out by way of Billy's Lake, Log River, and Suwannee River to Mixon's Ferry — a course frequently explored during our sojourn in the swamp.

A few words should be said here concerning the Lee family of Billy's Island, to whom we are indebted for much valuable information concerning the Okefinokee and its natural history. Throughout our stay in the swamp we were in daily contact with these people, and employed four of the men as guides. The family settled here about thirty years ago, and have remained the only permanent inhabitants of the swamp's remote interior. (Two other families, long known as inhabitants of the swamp, are the Mixons on the western, and the Chessers on the eastern borders.) During their long residence in the heart of the swamp the Lees have gained an unusually intimate acquaintance with the various forms of its plant and animal life. They not only have names for practically all the birds except some of the smaller and less distinctive *Passeres*, but could also give interesting and very trustworthy accounts of their habits. They are likewise familiar with most of the other vertebrates. Their knowledge of the plants of the swamp is scarcely less full; and there were few species that they could not name for us. While most of their local names are either exactly or recognizably similar to those in general use in the South, others appear to be altogether unique; and we consider them all of such interest as to be worthy of inclusion in the annotated list of species.





CHASE PRAIRIE, WITH PINE 'HEADS.'

HABITATS.

In the eastern United States few, if any, areas of equal extent afford such exceptional opportunities for the study of animal life in a primeval state as does Okefinokee Swamp. Handicapped as we were by time and the difficulties of exploration, we can make this report only a preliminary survey of ecological conditions which might well occupy years of immediate and attentive study, before the commercial encroachments destroy this paradise for the present-day naturalist.

As R. M. Harper¹ has pointed out, 'The various aspects of different parts of Okefinokee Swamp seem to depend almost entirely on the distance of the sandy bottom below or above the water level.' The swamp may be divided conveniently into four major ecological divisions: the islands, the cypress 'bays,' the prairies, and the watercourses. The cypress 'bays' and the prairies are probably about equal in area, and cover by far the greater part of the swamp. A glance at the map (Plate I) will show the extent of the islands and the more important prairies. Though all of the swamp, exclusive of the islands, is inundated, the smallest of the four divisions is the open watercourses.

The islands. These are covered for the most part with pine barrens (Plate XVII). The long-leaf pine (*Pinus palustris*) predominates in the drier areas, and the slash pine (*P. Elliottii*) in the more moist situations. Beneath the pines is an abundant and practically continuous growth of saw-palmetto (*Serenoa serrulata*). Intermixed with it is a heath (Ericaceae) society, composed of several species of huckleberries (*Gaylussacia*) and blueberries (*Vaccinium*), 'poor grub' (*Xolisma ferruginea*), 'gallberry' (*Ilex glabra*), and 'calico bush' (*Kalmia hirsuta*). The huckleberries and blueberries grow in the utmost profusion, and form an important element in the food of many birds and mammals. A third and lower group of plants consists of sedges and other small herbs. The islands are so flat and rise so slightly above the level of the swamp, that there is very little drainage; and after rains the sandy soil is covered with water in many places. Over the limited

¹ *Loc. cit.*, p. 606.

land surface crawl numerous snakes, among which may be mentioned the spreading adder (*Heterodon platyrhinus*), black snake (*Zamenis constrictor*), king snake (*Ophibolus getulus*), and three species of rattlesnakes (*Crotalus adamanteus*, *C. horridus*, and *Sistrurus miliarius*). The Florida terrapin (*Chrysemys floridana*) and the southern soft-shelled turtle (*Trionyx ferox*) come upon the islands in large numbers to deposit their eggs, which furnish a much-prized article of diet for the predaceous mammals, such as the opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), Florida bear (*Ursus floridanus*) skunk (*Mephitis elongata*), and wild cat (*Lynx ruffus*). That the ground-loving birds maintain themselves while so many enemies are rampant in these restricted quarters, is surprising. Furthermore, some of the islands are often burnt over by the residents or by hunters in order to improve the grazing or to facilitate hunting. Among the birds that are most typical of this habitat and show a decided preference for it, are the Bob-white, Red-cockaded Woodpecker, Wood Pewee, Florida Blue Jay, Southern Meadowlark, Pine-woods Sparrow, White-eyed Towhee, Summer Tanager, Pine Warbler, Brown-headed Nuthatch, and Bluebird. The Sandhill Crane, Florida Red-shouldered Hawk, Yellow-billed Cuckoo, Southern Hairy Woodpecker, Pileated Woodpecker, Red-headed Woodpecker, Red-bellied Woodpecker, Kingbird, Crested Flycatcher, Yellow-throated Warbler, Carolina Wren, and Florida White-breasted Nuthatch also occur here (and most of them commonly), but at the same time are found in greater or less numbers elsewhere within the swamp.

The pine barrens surrounding the swamp bear a general resemblance in topography and vegetation to those on the islands, but are for the most part somewhat higher and drier. They have suffered much from the lumbering and turpentine industries. Among the birds, the Wild Turkey, Mourning Dove, Sparrow Hawk, Southern Hairy Woodpecker, Flicker, Chuck-will's-widow, Nighthawk, Purple Martin, and Brown Thrasher appear to be more common in the environs than in the pine barrens within the swamp. Among the other groups, it is asserted that such forms as the gray fox (*Urocyon cinereoargenteus*), 'salamander' (*Geomys*), and coachwhip snake (*Zamenis flagellum*) do not reach the Okefinokee islands. An intensive study and comparison of the two faunas would doubtless reveal other interesting differences.

The hammocks occupy practically the whole of some of the smaller islands, and the borders of some of the larger ones (Plate XX). The tree growth here consists of such species as 'spruce pine' (*Pinus Tæda*) 'live oak' (*Quercus geminata*?), 'water oak' (*Quercus nigra*), 'loblolly' (*Magnolia grandiflora*), 'sweet bay' (*Persea pubescens*), and sweet gum (*Liquidamber Styraciflua*). Saw-palmetto forms a conspicuous part of the undergrowth. The Pileated Woodpecker, Red-bellied Woodpecker, Crested Flycatcher, Acadian Flycatcher, Cardinal, Hooded Warbler, and Carolina Wren are the common birds of this habitat; it is noteworthy, however, that none of them are confined to it. Our few records of the Red-eyed Vireo within the swamp were made in the hammock on Billy's Island.

Cypress 'bays.' (Plates XX and XVIII.) The dominant plant growth of the 'bays' is the pond cypress (*Taxodium imbricarium*); and probably nowhere else in the world does it attain a heavier growth or finer proportions. The river cypress (*T. distichum*) also is found in some places, especially along the lakes and 'runs.' Among other important trees are the black gum (*Nyssa sylvatica*), red bay (*Gordonia Lasianthus*), white bay (*Magnolia virginiana*), and sweet bay (*Persea pubescens*). The red maple (*Acer rubrum*) is less common. From the trees hang great festoons of Spanish 'moss' (*Tillandsia usneoides*). The undergrowth consists of such plants as the 'hurrah bushes' (*Pieris nitida* and *Leucothoë racemosa*), 'gallberry' and other shrubs, tall ferns (*Lorinseria* and *Osmunda*), and poison ivy (*Rhus radicans*). In many places the 'bamboo vine' (*Smilax laurifolia*) and the muscadine (*Vitis rotundifolia*) bind the undergrowth into an impenetrable tangle. As a general rule, these shrubs and vines are more abundant at the edges of the 'bays' along the watercourses, where they receive more sunlight than within the depths of the cypress forests. During our stay the water in the 'bays' stood at an average depth of several feet, but in drier seasons this depth is greatly reduced and the underlying muck is exposed over large areas.

The southern gray squirrel (*Sciurus carolinensis*), raccoon, Florida bear, and wild cat are at home in the cypress 'bays.' The pied water snake (*Natrix taxispilota*) and the cottonmouth (*Ancistrodon piscivorous*) drop from the bushes along the 'runs' as one

paddles by. The birds most typical of this habitat are the Florida Barred Owl, White-eyed Vireo, Prothonotary Warbler, Swainson's Warbler, and Parula Warbler. Others that are not confined to the cypress 'bays,' but are more common here than in any other habitat, are the Florida Red-shouldered Hawk, Yellow-billed Cuckoo, Pileated Woodpecker, Acadian Flycatcher, Cardinal, Carolina Wren, Tufted Titmouse, and Carolina Chickadee. Among the more generally distributed forms that occur here in numbers are the Red-bellied Woodpecker, Crested Flycatcher, Yellow-throated Warbler, Hooded Warbler, and Florida White-breasted Nuthatch.

There are several minor ecological divisions that bear more or less resemblance to the cypress 'bays.' These are the cypress ponds, sphagnous bogs, and prairie 'heads.'

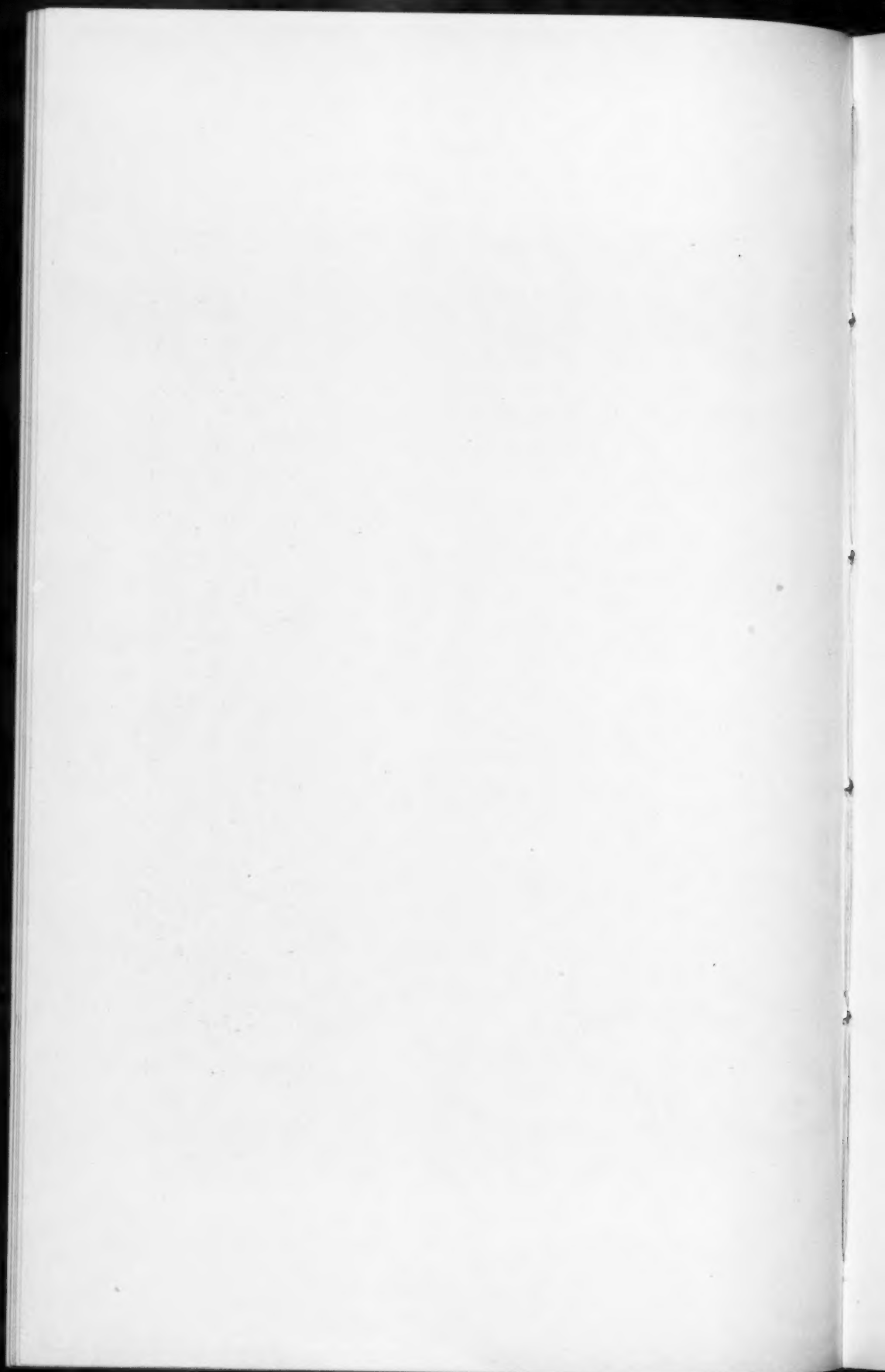
Within the larger islands are many small cypress ponds, generally of only an acre or two in extent. (Plate XIX.) They do not differ greatly from the cypress 'bays,' although the trees are not so close together and the undergrowth is for the most part confined to the edges. Frequently an alligator makes this its haunt. Practically every one of the ponds furnishes a home for a pair of Prothonotary Warblers and for a pair of Florida Yellowthroats as well. The flocks of Florida Grackles are found most commonly here, and the Carolina Chickadee is frequently noted. The Wood Ibis also is said to feed in these ponds.

In some cases the cypress 'bays' directly adjoin the islands. A number of islands, on the other hand, are enclosed by sphagnous bogs of varying width, beyond which lie the prairies. In the bogs the cypresses are smaller and grow much more openly than in the 'bays'; the slash pine also is common. The plants of the undergrowth, which is extraordinarily thick, are much the same here as in the 'bays,' but they also include the pitcher plants (*Sarracenia minor* and *S. psittacina*). A dense bed of sphagnum, which sways and quivers underfoot, rests upon the water and muck. Some of the prairie 'heads,' (Plate XVI), in which slash pines replace the cypresses, and where the sphagnum grows in great profusion, may also be included in this division. Our observations in this habitat, though very limited, apparently show that the bird species are far from numerous.

The cypress 'heads' or 'houses' (Plate XIV) on the prairies vary

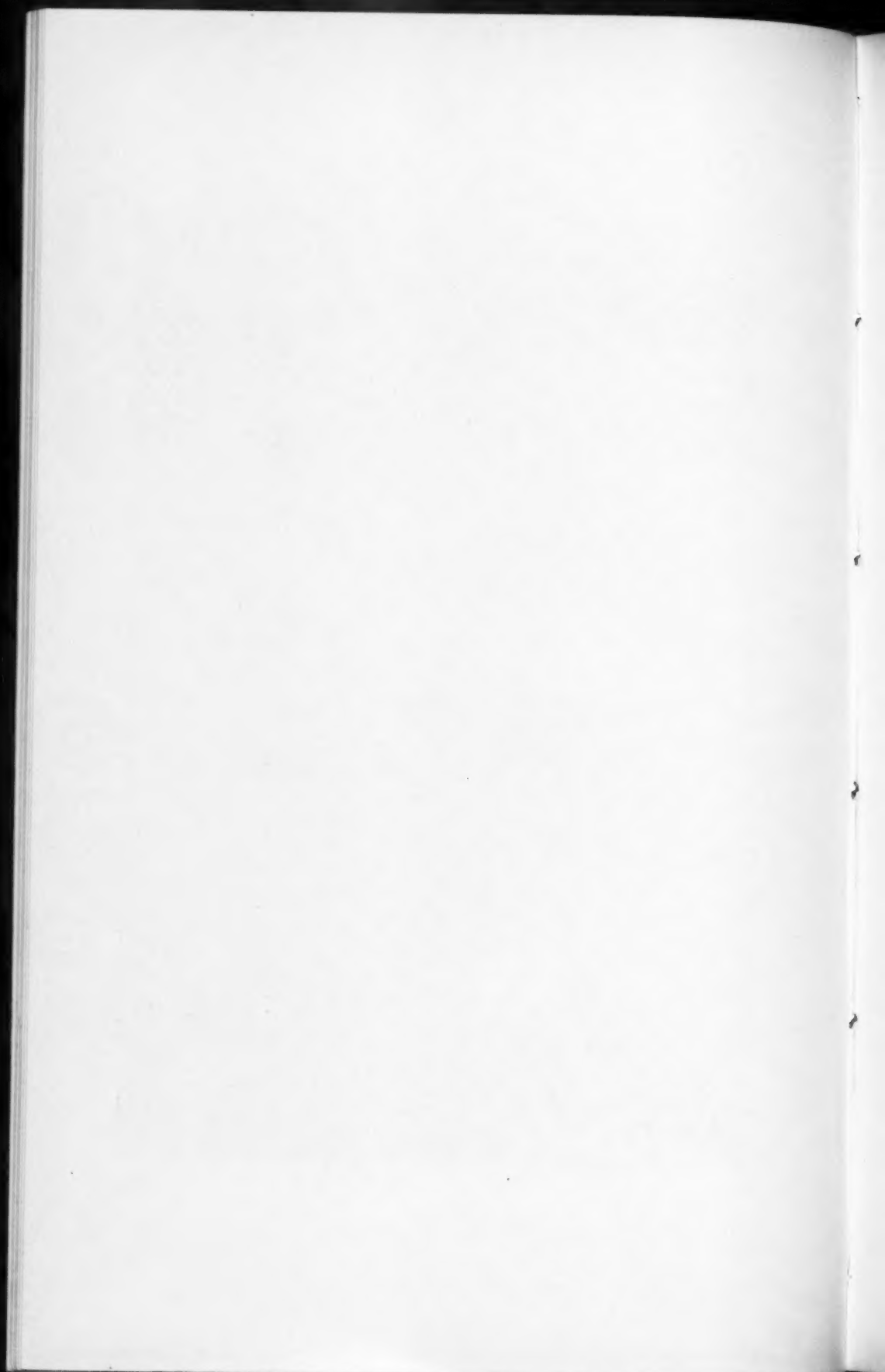


PINE BARRENS ON BILLY'S ISLAND.





MINNE'S LAKE AND BORDERING CYPRESS 'BAY.'



in size from a clump of a few trees to areas of a mile or more in extent, the latter differing little, if at all, from the cypress 'bays.' The smaller 'heads' are generally covered with buttonbushes (*Cephalanthus occidentalis*), 'hardwood' (*Cyrilla racemiflora*), white alders (*Clethra alnifolia*), 'hurrah bushes,' and 'bamboo vines'; and enclosed within this shrubby tangle are white bays sweet bays, and a few taller cypresses. Some islets of this sort contain ground dry enough to furnish camping sites. The Yellow-billed Cuckoo, Kingbird, Florida Grackle, Yellow-throated Warbler, Florida Yellow-throat, and Carolina Wren are common here. We also found the Water-Turkey, Ward's Heron, and the Fish Hawk nesting in these 'heads.'

Prairies. (Plate XVI.) The 'prairies' of the Okefinokee are by no means prairies in the ordinary sense of the term. One prairie may differ considerably from another, but all are essentially flooded marshes, or shallow lakes filled to a great extent with aquatic vegetation. In wet seasons one may pole his boat almost at will over these expanses; during dry summers, however, the muck is exposed, and little water is left except in the deeper parts, such as the 'gator holes.' On Floyd's Island Prairie the water is so shallow, even during the wettest seasons, and the sphagnum and other aquatic plants grow so profusely, that navigation is extremely difficult, if not impossible, over a large portion of this area. The plants of the prairies have their roots in the underlying muck, which in turn rests upon a sandy bottom. The vegetation is arranged in several distinct zones. In the deeper and more open parts, the species of greatest abundance and most widespread distribution is the white water-lily (*Castalia odorata*). Interspersed with it are arrow-head (*Sagittaria*), 'wampee' (*Pontederia cordata*), 'bull-tongue' (*Orontium aquaticum*), arrow arum (*Peltandra*), and other characteristic aquatic herbs. Here and there the water-lilies are replaced by purple bladderworts (*Utricularia purpurea*), upon the seeds of which raccoons and winter Ducks feed regularly. In the shallower parts, thick beds of 'maiden cane' grow. This zone is especially noticeable around the edges of some of the cypress 'heads,' the shrubs and trees of which rise in succession behind it. Saw-grass, also, grows with the 'maiden cane' in some small open glades (which may be likened to prairies) within the cypress 'bay' north of Billy's Lake.

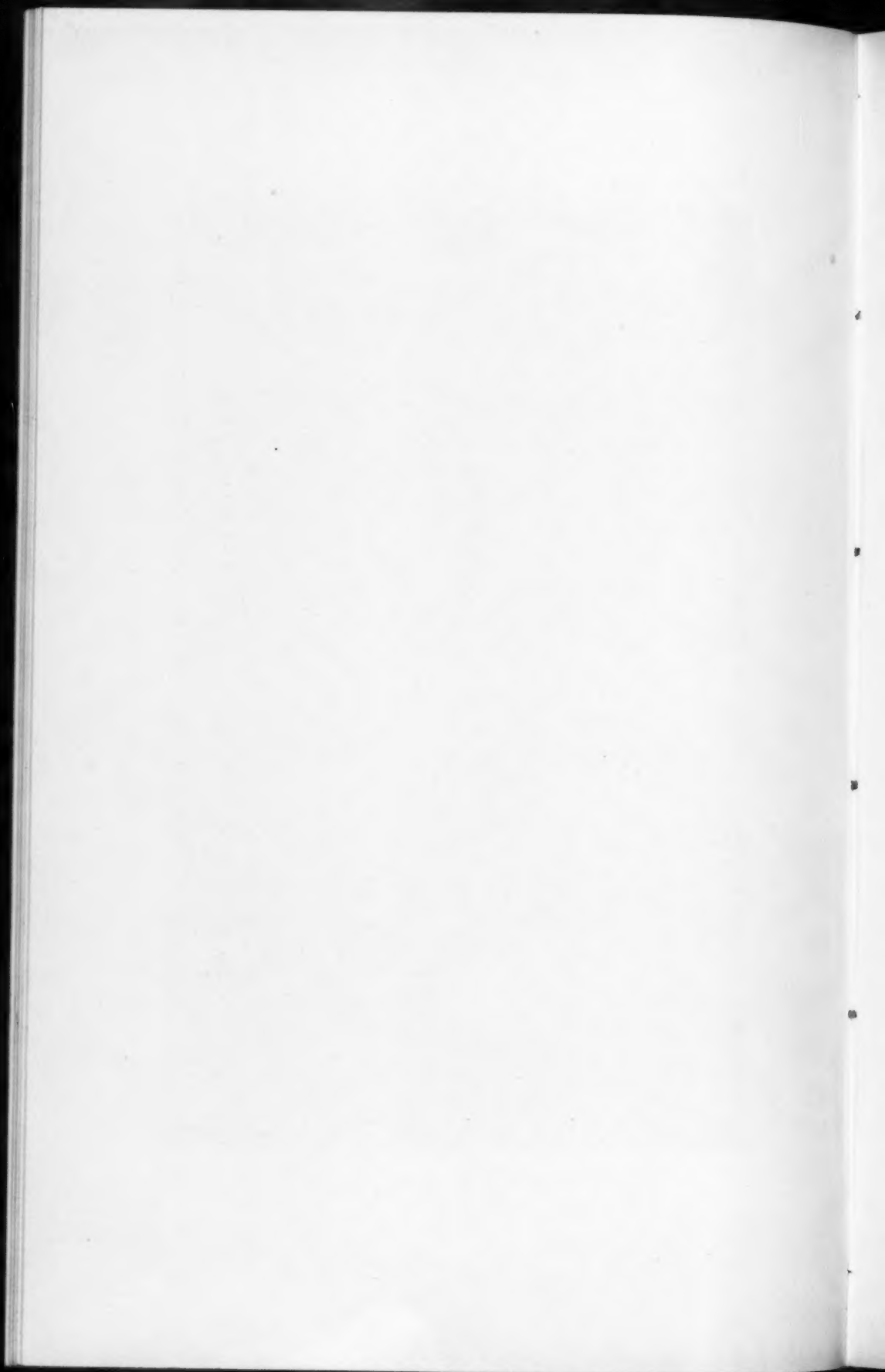
The bears wander from 'head' to 'head' across the prairies, and in the sphagnum bordering the 'heads' are seen the trails, or so-called 'slides,' of otters (*Lutra hudsonica*). Among the water-lilies abound ribbon snakes (*Eutaenia sackenii*), killifishes (*Fundulus* and *Gambusia*), and several species of frogs (*Chorophilus*, *Acris*, *Hyla* and *Rana*), whose evening chorus is one of the features of the swamp. In some of the deeper parts, which are either naturally free of vegetation or kept clear by alligators (*Alligator mississippiensis*) and hence called "'gator holes"—there are also southern soft-shelled turtles and warmouths (*Chaenobryttus gulosus*). These parts are a foraging ground for the Water-Turkey, Wood Duck, and Fish Hawk. Ward's Heron, the American Egret, the Little Blue Heron, the Green Heron, and the Sandhill Crane feed where the water is not too deep, and in dry seasons these and other waders doubtless occur on the prairies in much larger numbers than we found them during the period of exceptionally high water in 1912. The Florida Redwing nests here among the aquatic plants rising above the surface.

Watercourses. (Plate XVIII.) This habitat may be considered to include all the bodies of open water in the swamp, among which may be mentioned Billy's Lake, Minne's Lake, the Big Water, the abandoned logging canal, Buzzard Lake, Gannet Lake, and the upper courses of the Suwannee River. (See map.) The surface of the water in the swamp varies in level as much as 15 feet between various points. Consequently, throughout most of the swamp there is a perceptible current in the direction of the Suwannee River; it is especially noticeable in the narrow 'runs' or water trails that afford the only means of traversing the cypress 'bays' by boat. Most of the lakes are simply wider and deeper parts of these 'runs'; and Billy's Lake, the largest body of water in the Okefinokee, is probably not over a hundred yards in its greatest width. (The width of some of the lakes is unavoidably exaggerated in the map.) Yellow water-lilies or 'bonnets' (*Nymphaea macrophylla*) form an abundant and characteristic growth in the 'runs' and along the borders of the lakes; the swamp loose-strife (*Decodon verticillata*) and purple bladderwort (*Utricularia purpurea*) are also found here.

Some of the characteristic vertebrate forms of the water courses

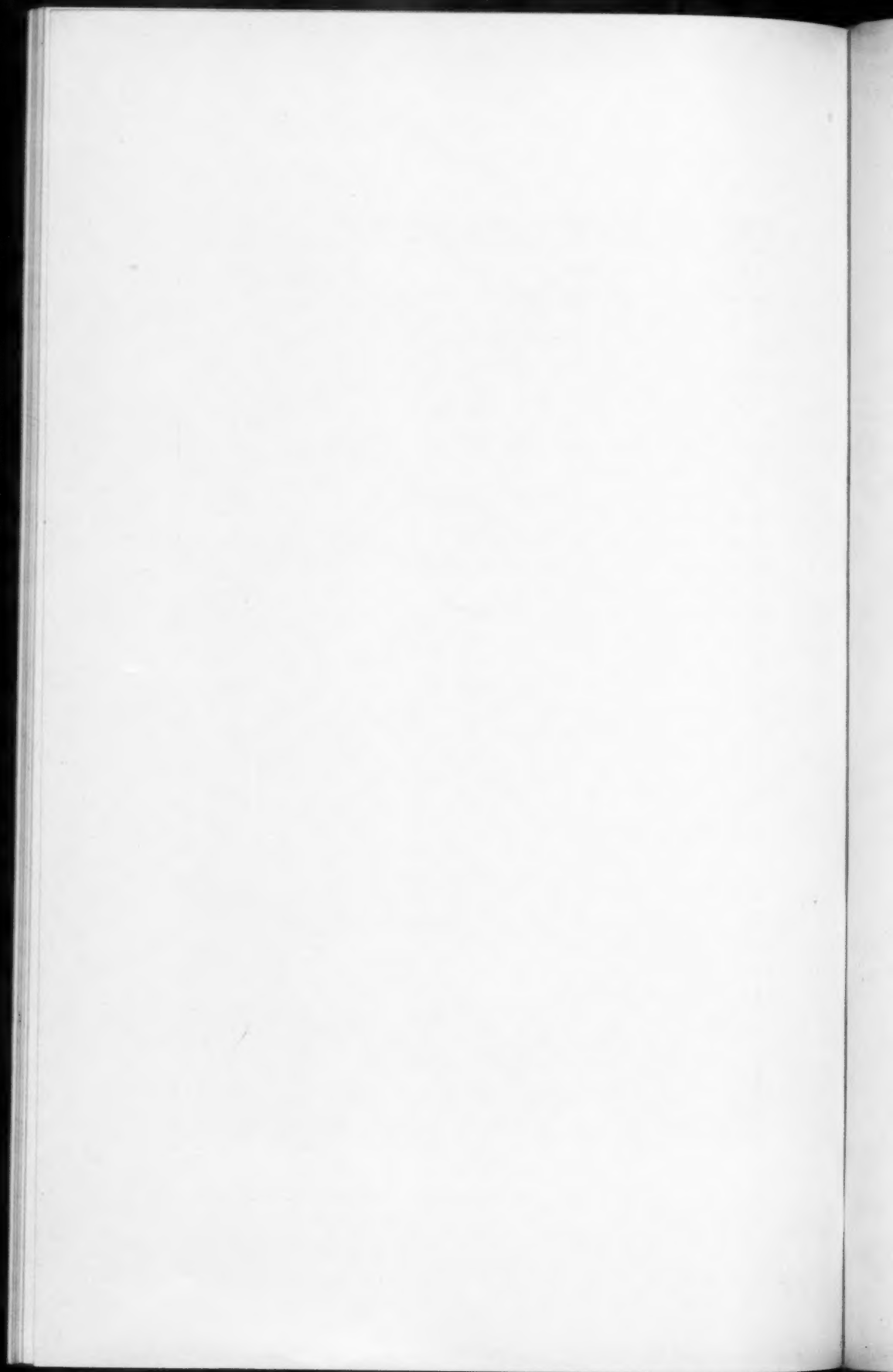


A CYPRESS POND ON BILLY'S ISLAND.





1. HAMMOCK ON FLOYD'S ISLAND.
2. A RUN THROUGH A CYPRESS BAY (BILLY ISLAND BAY).



are the pied water snake, pilot snake (*Coluber obsoletus*), southern soft shelled turtle, alligator snapper (*Macrochelys lacertina*), alligator, large-mouthed black bass (*Micropterus salmoides*), warmouth, and other basses (Centrarchidae), two pickerels (*Esox americanus* and *E. reticulatus*), and various catfishes (*Ameiurus*) and killifishes. The summer birds of this habitat are few in number, including only the Water-Turkey, Wood Duck, and Fish Hawk. The Chimney Swift, which skims low over the surface, may also be mentioned. In the winter, when Coots and various species of Ducks arrive from the north, the numbers of water birds are considerably augmented.

The close affinity of the Okefinokee avifauna with that of the Florida peninsula is shown by the presence of such birds as Ward's Heron, the Limpkin, the Florida Blue Jay, and the Florida Red-wing. The last two, while intermediate between the typical species and the subspecies, are distinctly referable to the Florida form. The same statement could very likely be made concerning the Night-hawk if we had secured specimens. Other birds of the swamp whose ranges extend only slightly further north along the Atlantic coast are the Sandhill Crane, Florida Red-shouldered Hawk, Florida Barred Owl, Florida Grackle, Pine-woods Sparrow, White-eyed Towhee, and Florida White-breasted Nuthatch. In contrast to the Blue Jay and the Red-wing, the Bob-white of the Okefinokee belongs decidedly to the northern form, though the specimens show some slight tendencies toward the characters of *Colinus virginianus floridanus*.

LIST OF SPECIES OBSERVED.

1. **Anhinga anhinga.** WATER-TURKEY.—These birds are common on some of the larger waterways of the Okefinokee. They seem to be congregated chiefly along the Big Water and on the Suwannee River, where single birds or small groups were frequently seen soaring high in the air. On Billy's Lake a few were observed. In some years they have nested at the north end of Minne's Lake. On May 21 a colony of three or four nests was located in a cypress head on Floyd's Island Prairie. Curiously enough, the birds were sitting on empty nests, and a broken eggshell halfway down one of the cypress saplings was the only material evidence of breeding. No eggs were found when the same place was visited on June 27. Sometimes the Water-Turkeys nest in isolated pairs, and at

other times in the heronries. On June 18 a nest was found about five feet above the water in a buttonbush (*Cephalanthus occidentalis*). It consisted of a platform of sticks, larger and more compact than the surrounding nests of the Little Blue Heron. On the edge of this dung-covered nest four young were resting. The old bird perched in a pine tree at a distance, and did not approach while we were present.

The natives say that this species sometimes gorges itself to such an extent that it becomes unable to fly, and can make its escape only by the water. At the approach of our boat in the Minne Lake Run, a Water-Turkey plunged head foremost from its perch and disappeared, though indicating its swift course beneath the surface by the shaking bonnet stems. A bird alternately flapping and sailing across a bit of bonnet-strewn prairie, against a background of moss-hung cypresses, presents a striking and beautiful spectacle.

A Water-Turkey's bill is no mean weapon, as attested by the blind eye of one of the native boys, who received a thrust from a tame bird.

2. **Aix sponsa.** WOOD DUCK; 'Squealer'; 'Summer Duck'.—The Wood Duck is still found in considerable numbers on the lakes, streams, and flooded prairies of Okefinokee. It is apparently the sole summer resident of its tribe in the swamp, for the Florida Duck is unknown there. The Big Water and Honey Island Prairie are especially favored haunts. Several broods of young were observed in late May and early June. At such times they are often found in flocks as large as eight to sixteen. They eluded our pursuit by swiftly scurrying along the bushy borders of cypress 'heads.' The natives not infrequently capture the tender, half-grown young with dogs, and eat them with considerable relish. We were shown a hole in a dead pine on Billy's Island where both the Wood Duck and the Pileated Woodpecker had nested at different times. After the nesting is over and the young can fly, the Wood Ducks are said to betake themselves in considerable numbers to particular spots in the prairies, such as the southern part of Floyd's Island Prairie, where they associate with the Hooded Mergansers ('Frog Ducks'), but remain apart from the other Ducks of the fall and winter. The shrill little whistle of the male is very distinct from the louder and comparatively hoarse quack of the female.

3. **Guara alba.** WHITE IBIS; 'Curléw'; 'White Curléw'.—The White Ibis is reported as quite common in the swamp, but our own records are not numerous. Eight or nine birds were seen flying over the northern part of the swamp on May 8. On June 19 we observed three 'Curlews' flying high over Billy's Lake. A week later a flock of eight was flushed from a small pond on the outskirts of the swamp. During the last week of the party's stay, July 7-13, they became more common in the swamp itself. They breed in colonies with Egrets and other Herons. In 1910 they nested with Egrets on Minne's Lake. The following summer they resorted to the same place, but were fewer in number. For years they have roosted in cypress 'heads' on Floyd's Island Prairie, to and from which they were seen going morning and evening. These flocks are said to consist

sometimes of a single file of two or three hundred birds, while at other times they fly in a V-formation like Geese. The natives speak of 'Brown Curlews' which often fly and feed apart from the white forms. They also designate some brown and white ones as 'Pieded Curlews' or 'Black-pieded Curlews,' which roost with the other two. These are doubtless the younger phases of the one species. The hunters eat these 'Curlews' either 'stewed like chicken' or fried as are Wood Ibises.

4. **Mycteria americana.** WOOD IBIS; 'Flinthead'; 'Ironhead'; 'Mulehead'; 'Baldhead'; 'Wood Gannet'.—Fairly common. It is said that in dry weather the Wood Ibises occasionally resort to Billy's Island in flocks of one or two hundred. At such times the temporary pools in which killifishes are stranded prove enticing feeding grounds, as do the small cypress ponds on the islands. On May 30 two individuals were recorded flying over Honey Island, on the south edge of which the species has formerly roosted. On June 18 four of these remarkably fine birds circled and circled over a colony of Little Blue Herons, revealing from time to time in their turns the sheen of their backs. While a few were seen in May and June, they began in July to assemble in flocks. In descending the Suwannee on July 13, our party flushed flock after flock until 200 or more birds were sailing overhead. The members of the party observed that while rounding a bend in the river, they would hear a resounding noise like some one pounding on a hollow stump, and in every case the apparent cause was a Wood Ibis. The appearance of the birds when soaring very high in the air is Buzzardlike.

This species is considered a game bird, and is eaten whenever it can be secured. The native recipe is: 'Cut the breast crosswise; dip it in a little flour; wet it up; pack it; and then fry it.'

5. **Botaurus lentiginosus.** BITTERN; 'Marsh Hen'.—Uncommon. On June 17 we flushed our only 'Marsh Hen' along the Suwannee. It is said to frequent the prairies.

6. **Ardea herodias wardi.** WARD'S HERON; 'Po' Job'; 'Po' Jo'.—Fairly common. Generally distributed on the prairies and along the water-courses, and frequently seen flying over the wooded portions of the swamp. They were most common on Floyd's Island Prairie, where several were recorded on May 21 and 22, and a dozen more on June 25-27. This has been a favorite roosting place for several years. At dusk on June 25 and 26 we observed several birds coming into the prairie for the night. Here, on May 22, a nest with one well-grown young was located in a cypress 'head' some 60 or more feet above the water. Along the Suwannee River numbers were seen, and on June 18 several were found in a large colony of the Little Blue Herons on the west of the river. Here a nest was espied in a pine tree at least 70 or 80 feet above the water. The natives pronounced the 'Po' Job,' good eating; but when we tried a young one, all agreed that it was too bitter for our tastes.

7. **Herodias egretta.** EGRET; 'Plume-bird'; 'Big White Plume-bird'; 'White Crane'.—Formerly common. On May 20 Mr. Bryant Lee

found a number of these birds in a large colony of Little Blue Herons between Mixon's Ferry and Fargo. On June 18 three adults were observed at the same place and they proved fairly tame. Before the plume law of Georgia was enacted, hunters used to kill as many as 200 in a day in this resort. In 1910 there was a colony of 175-200 Egrets and White Ibises on Minne's Lake, and another of the same species and numbers was found in 1909 on the Big Water. On June 25 and 27 we saw two very shy Egrets flying over Floyd's Island Prairie. From July 7 to 12 a quartette of Egrets frequented a swampy bog between Gallberry and Billy's Islands. In the morning, even before daylight, our party always found them feeding in the bog, and in the evening, roosting in near-by trees. Although they were wild, and received considerable attention, they did not leave the place.

8. *Florida cærulea*. LITTLE BLUE HERON.; 'Blue Scoggin.'—Common. A colony of several hundred birds was reported nesting in Cowhouse Bay in May. During this month a few adults and one immature bird were observed in the northern part of the swamp, and on June 27 several others were seen over Floyd's Island Prairie. Along the western borders of the swamp, in former years, there were two or three colonies of Little Blue Herons. One at Scoggin Pond was forsaken this year for the first time. Between Mixon's Ferry and Fargo there is another which is said to have been in existence for a long time. It was reported by Mr. Bryant Lee to contain about 500 nests with eggs and young on May 20. On our way to the same colony on June 18 we saw adults either coming or going almost every minute. The heronry is surrounded on three sides by a thin rim of pines, within which the squeaking, chickenlike calls of the young were heard. Here, in a swampy tangle where one goes waist-deep, the meager platforms of sticks are placed. The growth is mainly button-bush (*Cephalanthus occidentalis*), 'hurrah bush' (*Leucothoë racemosa*) and 'latherleaf' (*Clethra alnifolia*). The nests were from three to seven feet above the water; the average was four or five feet. At this season we found only half a dozen nests with eggs, and about as many more with young. All the other nests were empty, and many were more or less displaced. All about us were the white young in the higher bushes and pine saplings, some of which were bending beneath a load of ten to twenty birds. No more than six dead young were found in the whole heronry. From one position we could easily count 200-250 birds, of which only ten or twelve were adults. In all we saw 800-1000 young birds in this heronry, and no doubt many of stronger ones had left with the adults for the feeding grounds. On the previous day we had observed them on the Suwannee River. In the whole heronry we saw no more than three young in which the blue of the wings had begun to show. We learned on inquiry at the turpentine still three miles away that the negroes in former years used to gather the eggs in baskets for culinary purposes. It is almost equally certain that the birds were used for food. So far as we could determine, neither of these practices was indulged in this year.

9. ***Butorides virescens virescens***. GREEN HERON; 'Indian Pullet'; 'Indian Hen.'—Not common; much less numerous than either Ward's or the Little Blue Heron. A few were observed on the borders of the prairies and along the edge of Billy's Lake.

10. ***Nyctanassa violacea***. YELLOW-CROWNED NIGHT HERON.—Not until nesting was completed were any of these Herons seen. For several days (July 7–11) an adult and three young were watched in a cypress swamp near our camp. An adult and one young were taken at Billy's Lake on July 8.

11. ***Grus mexicana***. SANDHILL CRANE; 'Whooping Crane.'—These birds are fairly widespread in their distribution within the Okefinokee, which is one of their few remaining retreats east of the Mississippi. They have here lost neither their watchful alertness nor their keenness of vision. A number of our records were only musical memories. The birds were often flushed on the edges of the islands, where it was an easy matter for them to escape through the cypresses; in fact, if they had not announced their start, they might often have slipped away undetected. Their note is one of the finest sounds of the swamp. It is so unbirdlike, and yet rings so clear, is so far-reaching, and possesses such measured qualities, that the listener longs for an instant repetition. We found the Cranes on Billy's, Honey, and Floyd's Islands, and on Chase and Floyd's Island Prairies. We seldom observed them alone; they usually traveled in pairs or in parties of three or four. They are said to breed in the prairies, but at other times seem to prefer the pine woods with their growth of saw-palmetto and ericaceous plants. Here they find vast quantities of huckleberries, and are doubtless attracted also to pools where killifishes and tadpoles have entered at high water. We never realized what service their legs render them, until we winged one close at hand. All we ever saw of the bird after it alighted was a feather and some long strides in the sand. Unfortunately, the natives have a decided penchant for the 'Whooping Crane,' and never lose an opportunity to secure the 'fine eating' it affords them.

12. ***Aramus vociferus***. LIMP KIN.—On May 13 one or two individuals of this now uncommon species were observed flying over a prairie southeast of Honey Island. Its singular appearance on the wing and its weird cry were noted. It probably breeds here.

The records for Georgia seem to be very few. Its nesting in the state between the years 1853 and 1865 has been mentioned by H. B. Bailey (*Auk*, VII, 1883, p. 42). William Bartram, writing of his experiences on the Altamaha River in 1773 (*Travels*, 1791, p. 49), says, 'The crying-bird, another faithful guardian, screaming in the gloomy thickets, warns the feathered tribes of approaching peril.'

13. ***Actitis macularia***. SPOTTED SANDPIPER; 'Sweet.'—The Spotted Sandpiper was a distinct surprise as a summer resident of the swamp. Not only is this several hundred miles south of its known breeding range, but one would not expect it to find a suitable haunt in the Oke-

finokee. The lakes and runs are practically shoreless; they are simply open spaces in the otherwise continuous cypress swamps. However, the logs and driftwood near the edges of Billy's Lake serve as teetering stands; half a dozen were seen here on May 11, one on June 5, and still another a few days later. Earlier in the spring one or two were reported from the canal.

The species probably does not breed in this latitude. (See Wayne, *Birds of South Carolina*, 1910, p. 55.)

14. *Colinus virginianus virginianus*. BOB-WHITE; 'Partridge.'—Abundant in the pine barrens, both on the islands and in the country surrounding the swamp. A female taken on June 27 had in her crop seven grasshoppers, two snails in shells, two beetles, several spiders, one daddy longlegs, and numerous blueberries (*Vaccinium*). The oviduct of the same bird contained a fully formed egg. About the middle of May a nest with eggs was found by the natives on Billy's Island. They assert that Sparrow Hawks and probably wild cats prey upon the 'Partridges.'

15. *Meleagris gallopavo silvestris*. WILD TURKEY.—Rather scarce; more common in the country west of the swamp. It was formerly common in the swamp itself, but about fifteen years ago the decrease began to be perceptible, and the natives hold that it is due in part to the depredations of wild cats. The last Turkey was killed on Billy's Island about three years ago. A gobbler was flushed in The Pocket by a dog on June 26, and another was heard in the same place a year previously. On July 2 we heard a Turkey in the thick palmetto cover on one of the Minne Lake Islands.

16. *Zenaidura macroura carolinensis*. MOURNING DOVE; 'Turtle Dove.' Fairly common in the pineries about the edges of the swamp. It is said to occur sparingly on Billy's Island in the summer.

17. *Cathartes aura septentrionalis*. TURKEY VULTURE; 'Buz-zard.'—Common throughout the swamp. The natives have never found its nest. They told us, however, of several roosts, including one at Mud Valley (south of Billy's Lake) and another in the dead tops of some cypresses in a small 'head' on Floyd's Island Prairie. It is astonishing how soon the Buzzards appear over a spot where an alligator has been shot, and how quickly they transform its carcass into a bare skeleton.

18. *Catharista urubu*. BLACK VULTURE; 'Carrion (Cyarn) Crow.'—Not uncommon, but the preceding species outnumbers it by two or three to one. It is frequently seen associating on the wing with the Turkey Buzzard. The natives report that the two species also roost together, and that when a quarrel takes place, the Carrion Crow is always the overlord. The alligator hunters recognize the services of both birds in disposing of the offal in the vicinity of their houses and camps.

19. *Elanoides forficatus*. SWALLOW-TAILED KITE; 'Fish Hawk.'—Fairly common. Whenever these graceful birds appeared, it was an event worthy of attention. We seldom saw them coursing lower than the tree tops. Not infrequently they performed their easy gyrations as they passed over our camp, which was in a clearing. On one occasion a member of our

party saw a group of five birds turn repeated somersaults in the manner which Wayne has previously recorded (*loc. cit.*, p. 69). At another time we watched a pair ascend to a height thrice that of the tallest pines, when suddenly they shot headlong downward for some two or three hundred feet, halting on a level with the tree tops as quickly and easily as they began.

20. **Accipiter cooperi**. COOPER'S HAWK; 'Blue Darter.' One was observed on Honey Island on June 1.

21. **Buteo borealis borealis**. RED-TAILED HAWK; 'Rabbit Hawk.'—A pair were observed sailing over Floyd's Island on June 26. They were not sufficiently close to enable us to determine whether they were the typical species or *B. b. harlani*.

22. **Buteo lineatus alleni**. FLORIDA RED-SHOULDERED HAWK; 'Hen Hawk'; 'Chicken Hawk.'—Very common. This is one of the most widely distributed birds, as its scream is one of the most characteristic sounds, of the Okefinokee.

23. **Falco sparverius sparverius**. SPARROW HAWK; 'Tilly Hawk.'—Not common within the swamp. One or two were noted on Honey Island, May 13-15; here on June 1 we saw a nesting hole which was said to have been occupied earlier in the season. Another bird was observed on Cowhouse Island on May 23, and three more (including young of the year) on the outskirts of the swamp near Mixon's Ferry on June 17.

24. **Pandion haliaëtus carolinensis**. FISH HAWK; 'Fish Eagle'; 'Eagle.'—About fifteen Fish Hawks were noted. Their aeries usually occupy high and exposed situations in the prairie 'heads,' where they command views over wide expanses, and serve as landmarks. Of the six nests found, three were in pines on Honey Island Prairie; the other three, in dead cypresses on Floyd's Island Prairie, at the foot of Minne's Lake, and on Chase Prairie. They were situated from fifty to one hundred feet or more above the water. The only nest in a living tree was placed in the branches of a pine just below its large green top. The nest on Chase Prairie capped a huge cypress stump, and contained a well-grown young bird on May 17.

25. **Strix varia alleni**. FLORIDA BARRED OWL; 'Deer Owl'; 'Hoot Owl.'—Very common. Its deep, booming cry is sure to be heard at night, and is so characteristic of the Okefinokee that the natives use it as one of their signals when they are in trouble or far from home. The Barred Owl by night and the Red-shouldered Hawk by day furnish a round of weird and startling calls that one cannot soon forget. The former is a typical bird of the gloom-haunted cypress bays, the river bottoms of the Suwannee, and the small cypress ponds on the islands. It begins its calls in the late afternoon and continues them well into the evening. In the forenoon they may be heard until 9 or 10 o'clock, and occasionally throughout the hottest day. Several times its notes were uttered at midday when light rains were falling or impending. Besides its well-known resonant call, we heard a subdued, querulous note. The 'Deer Owl,' exhibit considerable curiosity; they responded frequently to poor imitations of their cry, and sometimes to the 'squeak.'

26. **Coccyzus americanus americanus.** YELLOW-BILLED CUCKOO; 'Rain Crow.'—Common. These birds were observed or heard usually on the borders of the prairies, in the depths of the cypress bays, or on the river bottoms of the Suwannee, but were also found occasionally in the high pines on the islands. A pair was seen copulating on June 7 on Billy's Island, and the male was collected. Its stomach contained a larval giant silkworm. In a tupelo tree at the margin of the Suwannee, on June 17, we found a nest containing two eggs. It was placed in a cluster of mistletoe on a horizontal branch four feet above the water, and consisted of sticks interwoven with Spanish 'moss' (*Tillandsia usneoides*). It was the best example of a Cuckoo's nest we have ever seen.

27. **Coccyzus erythrophthalmus.** BLACK-BILLED CUCKOO; 'Rain Crow.'—A single bird, doubtless a migrant, was observed on May 8.

28. **Dryobates villosus auduboni.** SOUTHERN HAIRY WOODPECKER.—Not common in the swamp itself; more numerous along the Suwannee and in the pine lands on the outskirts of the swamp.

29. **Dryobates pubescens pubescens.** SOUTHERN DOWNY WOODPECKER.—Rather uncommon. They were seldom seen on the islands themselves, but usually in their cypress edges. Our records were made in the swampy woods along Minne Lake Narrows, Log River Narrows, and especially the Suwannee River.

30. **Dryobates borealis.** RED-COCKADED WOODPECKER; 'Sapsucker.'—Rather common in open pineries, both on the islands and outside of the swamp. On May 19 a bird was seen at its nest about thirty feet up in a pine on Billy's Island. On May 28, near Mixon's Ferry, we noticed another occupied nest some fifty feet from the ground.

31. **Phlœotomus pileatus pileatus.** PILEATED WOODPECKER; 'Kate'; 'Wood Kate'; 'Woodcock'; 'Good-God Woodpecker'; 'Lord-God Woodpecker.'—With the exception of the Red-bellied Woodpecker, this is the most abundant member of its family in the Okefinokee. In fact, we saw as many as four Pileated Woodpeckers in a single tree. In every part of the swamp—especially the cypress bays, but also the hammocks and the piny woods on the islands, and even the 'heads' on the prairies—these magnificent birds are at home. They are rather shy. On Billy's Island they usually left the open pine woods and sought refuge within the bordering cypresses, long ere we came within gun range. We frequently heard them giving their great and deliberate rolls in the thick bay surrounding Billy's Lake. Occasionally they flew across the lake from tree top to tree top, or disappeared at the other end of a 'bonnet' lagoon just as we rounded the corner. They were very common along the Suwannee, where we several times endeavored to surprise them at work, but the slightest noise caused them to slip away farther into the depths of the forest. An unsuspecting pair of 'Kates' in a swampy thicket is a glorious spectacle; with their scarlet crests erect, they are the very embodiment of all that is wild. The birds are noisiest at sunrise, but their high-pitched, Flicker-like notes resound through the swamp at all times of the day.

32. **Melanerpes erythrocephalus**. RED-HEADED WOODPECKER; 'White Shirt'; 'Jerry Coat'; 'Shirt-tail.'— Not common. It was recorded on Honey Island, May 13-14 and June 1; at the Minne Lake Narrows, June 25; and on Floyd's Island, June 25.

33. **Centurus carolinus**. RED-BELLIED WOODPECKER; 'Sham-shack'; 'Ram-shack'; 'Chad-cherries.'— Abundant throughout the wooded portions of the swamp, in both the pines and the cypresses. Of the two habitats, they were recorded more frequently in the pines. In the partially cut pine lands about the swamp they were in equal abundance. On May 11 a bird was observed at its nest, which was at a height of about 35 feet in a dead pine on Mixon's Hammock. A male taken on June 8 had been eating blueberries and buprestid beetles. The 'Sham-shack' has a variety of call-notes, which it utters frequently; the commonest one has doubtless given rise to the local names.

34. **Colaptes auratus auratus**. FLICKER; 'Yellow-hammer.'— Not very common on the islands. More numerous in the country surrounding the swamp.

35. **Antrostomus carolinensis**. CHUCK-WILL'S-WIDOW; 'Whip-poor-will.'— Uncommon in the swamp. Only one was recorded within the swamp during our stay; it was heard on Billy's Island on June 19. Earlier in the spring two or three were noted by the natives. Between Mixon's Ferry and Fargo the birds were found to be very common.

36. **Chordeiles virginianus virginianus**. NIGHTHAWK; 'Bull Bat.'— Several Nighthawks were reported on Honey Island Prairie on the evenings of May 30 and 31. Beyond the borders of the swamp the birds are very common. They were noted on the northern side on May 3, 6, 8, and 23, and along the western margin on June 17, 18, and 23.

37. **Chaetura pelagica**. CHIMNEY SWIFT; 'Chimney Swallow'; 'Chimney Sweeper.'— Common. Most of our observations were made over the lakes or the prairies. The birds were frequently noticed skimming the lakes at midday in the hottest sun. They are found in the most remote parts of the swamp, many miles from any human habitation, and must make use of hollow trees as nesting sites. The Lees assert that the 'Chimney Swallows' do not use the chimneys of their cabins, and yet the Swifts course commonly enough over the near-by fields.

38. **Archilochus colubris**. RUBY-THROATED HUMMINGBIRD.— Not common. A few birds were observed about the dwellings on Billy's Island, especially at the crape myrtle ('lady's-streamer') bushes in one of the yards. Another was seen near the head of the Suwannee River on June 19.

39. **Tyrannus tyrannus**. KINGBIRD; 'Bee-bird'; 'Bee Martin.'— Very common on the prairies and islands, as well as on the outskirts of the swamp. On June 18 young were on the wing. On Honey Island we saw a 'Bee Martin' pursue a Sparrow Hawk and a Turkey Vulture, and on Floyd's Island, a Red-tailed Hawk.

40. **Myiarchus crinitus**. CRESTED FLYCATCHER; 'Yellow-tailed Bee-bird'; 'Yellow-tailed Bee Martin.'— Abundant. This bird is found

in every portion of the swamp and surrounding country. In fact, only the Red-bellied Woodpecker can compare with it in numbers and in widespread distribution. On May 28 we noted a nesting hole thirty feet up in a pine tree, whither the parents were carrying food.

41. *Myiochanes virens*. WOOD PEWEE.—Rather common. It seems to prefer the pines on the islands to any other environment within the swamp. In only a few instances was it observed among the cypresses.

42. *Empidonax virescens*. ACADIAN FLYCATCHER; 'Tick-bird.'—Common. This Flycatcher finds a congenial haunt in the gloom of the cypress 'bays,' where one often hears its note as he paddles along the narrow runs. It also frequents the hammocks and the cypress ponds. Within these shady retreats it appears unmindful of the summer temperature, and continues to utter its energetic call throughout the warmest and brightest days. A nest was discovered north of Billy's Lake on May 20; it was placed on a limb of a cypress sapling about ten feet above the water, and contained two eggs.

43. *Cyanocitta cristata florincola*. FLORIDA BLUE JAY; 'Jay-bird.'—Not very common. All of our records are restricted to the larger pine islands—Billy's, Honey, Floyd's, and Minne Lake Islands. A male and a female taken on June 7 had only blueberries and huckleberries in their stomachs.

44. *Corvus ossifragus*. FISH CROW.—Uncommon. A few were noted along the canal, May 17–18. The scarcity of Crows is a very noticeable and gratifying feature of Okefinokee bird life.

45. *Dolichonyx oryzivorus*. BOBOLINK.—Observed as a late migrant in May: a flock of 10, Billy's Island, May 9; a flock of 40 along the canal, May 17; and a male and a female on Floyd's Island Prairie, May 22.

46. *Agelaius phoeniceus floridanus*. FLORIDA RED-WING; 'Rice-bird.'—Common on the prairies in the northern portions of the swamp. On the prairies south of Honey Island they were not so common, only a few being seen on June 1 and 2. Along Billy's Lake and the Suwannee none were observed. The only place where we found them in wooded parts was the 'bay' beside Minne's Lake, which is not far from prairies on the east. On May 8 a nest with several eggs was found between Cowhouse Island and the Big Water. On May 21 two more nests with three eggs each were located on Floyd's Island Prairie.

47. *Sturnella magna argutula*. SOUTHERN MEADOWLARK; 'Field Lark'; 'Lark.'—Common in the pine barrens on the islands, and in the country surrounding the swamp. Open as the woods are, one can hardly become accustomed to the presence of the birds in a forested haunt. Some of their notes, too, have a quality that sounds strange to one familiar with the northern bird. On Honey Island we found young on the wing by June 1. The natives do not consider this a beneficial species.

48. *Icterus spurius*. ORCHARD ORIOLE.—A few were noted in the region beyond the northern border of the swamp: Hebardville, May 4, 5, and 24; Braganza, May 23.

49. *Quiscalus quiscula aglæus*. FLORIDA GRACKLE; 'Black-bird.'—Common. Within the swamp this species seems to show a decided preference for the cypress ponds on the larger islands and for the cypress heads on the prairies. It was also recorded frequently on the outskirts of the swamp. The birds were generally observed in small flocks, some of which numbered as many as fifteen individuals.

50. *Peuceæa æstivalis æstivalis*. PINE-WOODS SPARROW.—Common in the pine barrens, both on the larger islands and in the environs of the swamp. It is apparently the only Sparrow that breeds in the Okefinokee. It is emphatically a bird of the forest floor, seeking cover in the undergrowth of blueberries and saw-palmettoes, whence it reluctantly flushes to take a perch in a near-by pine. At daybreak it is one of the first birds to begin singing.

51. *Pipilo erythrophthalmus alleni*. WHITE-EYED TOWHEE; 'Joe.'—Fairly common among the saw-palmettoes on the islands; here it was observed in several instances close to the borders of small cypress ponds. A nest was found in such a situation on Billy's Island on May 10; it contained three young and one egg. The birds are more numerous beyond the western border of the swamp.

52. *Cardinalis cardinalis cardinalis*. CARDINAL; 'Redbird (with black chin).'—Fairly common in the cypress 'bays' along the lakes and watercourses, in the hammocks, in the cypress heads on Honey Island Prairie, and in swampy spots on the outskirts of the swamp.

53. *Piranga rubra rubra*. SUMMER TANAGER; 'Redbird (without black chin).'—Fairly common in the pines on Billy's Island, but not found elsewhere in the swamp except on Floyd's Island, where one or two were recorded. Several were observed on the western border of the swamp. Its song is a rich, dignified effort, considerably sweeter than that of the Scarlet Tanager. The stomach contents of a male taken on June 8 consisted of insect remains, all apparently Hymenoptera.

54. *Progne subis subis*. PURPLE MARTIN; 'Martin.'—A number of Purple Martins were observed at their gourd nests at Hebardville, May 4 and 5; at Braganza, May 8 and 23; and on the western edge of the swamp, May 30. The family on Billy's Island also kept Martin gourds in former years, but none of the birds were found this season within the swamp.

55. *Lanius ludovicianus ludovicianus*. LOGGERHEAD SHRIKE.—One was observed on May 5 at Hebardville, and another on May 8 at Braganza. The first bird was seen to chase a Red-cockaded Woodpecker for a considerable distance, and the fresh remains of one young and one adult Bluebird on a near-by stump offered further evidence of the Loggerhead's rapacity.

56. *Vireosylva olivacea*. RED-EYED VIREO.—Uncommon. Noted several times in the hammock growth on Billy's Island and twice on the northern side of the swamp.

57. *Vireo griseus griseus*. WHITE-EYED VIREO.—Fairly common in the densest tangles of undergrowth in the cypress 'bays.' Though it sings

most frequently in the early morning, even the extreme heat of midday does not deter this most versatile of our Vireos.

58. **Protonotaria citrea.** PROTHONOTARY WARBLER.— Abundant throughout the cypress 'bays,' where it is one of the most characteristic forms. The birds were observed most frequently at the edges of the growth along the watercourses, such as Billy's Lake and the Suwannee River. They repeatedly fly back and forth across the lake, and the male occasionally gives a spirited and surprising flight song. The Prothonotary appeared more responsive to the 'squeak' than any other bird of the swamp.

Four nests were found: one with four eggs, May 10, in a low stump in a cypress pond on Billy's Island; another with four fledglings, May 16, in a cavity of a small tree, about three feet above the water, Billy Island Bay; a third with several eggs, May 18, in the broken top of a living black gum sapling, about five feet above the water, Billy Island Bay; and, finally, one with four eggs, June 8, about ten feet up in a cypress on Billy's Lake. In each case the nests were not in deep holes with narrow openings, but in open cavities where the eggs or young could be plainly seen.

Several hours were spent on May 19 in an umbrella blind beside the first-mentioned nest, which then contained young. For the first hour or so the parent birds did not venture to the stump, but remained in the vicinity, frequently uttering a nervous *chip*. The male also sang occasionally. Finally he showed himself the more courageous or unsuspicious of the two, for he fed the young several times before the female came.

59. **Helinaia swainsoni.** SWAINSON'S WARBLER.— To find that this famed and elusive Warbler is a not uncommon inhabitant of the deep Okefinokee thickets, was one of the rarest pleasures of our sojourn in the swamp. We recorded it in the 'bay' on both sides of Billy's Lake, in the tangled growth along the west fork of the canal, in Billy Island Bay, on the edge of Mixon's Hammock, in the canebrake of Floyd's Island Hammock, and finally in some of the wildest and densest cypress woods of the swamp, between Minne's Lake and the Minne Lake Islands. Here on June 13 and 14, while lost and camping 'on top of the swamp,' we had a good chance to make its acquaintance. The song began early in the morning, continuing frequently until about 7 A. M., and at longer intervals for another hour or so. Thereafter it was heard only occasionally until late afternoon, when it began again to be given more regularly.

Swainson's Warbler remains under the close cover of the thicket's interior, and in order to secure a glimpse of it, one must push his way through a tangled barrier of bushes, vines, and thorns. But stalking alone will scarcely suffice. After cautiously approaching the spot whence the song seemed to come, we generally resorted to the 'squeak,' and in this way succeeded more than once in luring the singer to within a very few yards of us. On one occasion, when the 'squeak' failed, an imitation of the song itself immediately brought the desired effect.

60. **Compsothlypis americana americana.** PARULA WARBLER.— Abundant. Widely distributed in the swamp, but found in greatest num-

bers in the cypress 'bays,' where the luxuriant growth of *Tillandsia* provides the Parula with an ideal habitat. Young birds on the wing were seen at Minne's Lake on May 20.

61. *Dendroica striata*. BLACK-POLL WARBLER.—One or two migrants were observed along the canal on May 18.

62. *Dendroica dominica dominica*. YELLOW-THROATED WARBLER.—Rather common. We recorded it not only in the 'bays' and prairie 'heads,' but in the pine barrens as well. Although it usually remains high up in the tallest trees, it was also observed in the lower growth close to the water or the ground.

63. *Dendroica vigorsii*. PINE WARBLER.—Fairly common in the pine barrens within and without the swamp. We were surprised to find these birds also in considerable numbers among the cypress 'heads' of Honey Island Prairie.

64. *Geothlypis trichas ignota*. FLORIDA YELLOW-THROAT.—Quite common. Yellowthroats are found in and about the cypress ponds on the islands, in the 'heads' and along the borders of the prairies, and even far within the depths of the flooded cypress 'bays.' Along the run through the 'bay' between Billy's and Minne's Lakes several were brought into view by the 'squeak.'

65. *Wilsonia citrina*. HOODED WARBLER.—Fairly common. It was found usually in thickets and swampy places along the borders of the islands. The haunts it affects in the Okefinokee are much like those of Swainson's Warbler, although the latter seems to keep more closely, as a rule, to the wetter situations. Both species were observed in the same canebrake on Floyd's Island Hammock, the Hooded Warbler on the inner edge, and the Swainson's on the outer edge bordering the swamp.

66. *Setophaga ruticilla*. REDSTART.—A migrant was noted along the canal on May 18.

67. *Mimus polyglottos polyglottos*. MOCKINGBIRD.—Uncommon within the swamp, but common in its environs. No Mockingbirds were found in the interior in the summer of 1912, although one or two pairs generally nest on Billy's Island. They are also said to have been observed in numbers along the Big Water.

68. *Toxostoma rufum*. BROWN THRASHER.—A few are found on the islands in the swamp. On June 26 one was observed on Floyd's Island, and another was seen on Billy's Island. Several were recorded beyond the swamp borders.

69. *Thryothorus ludovicianus ludovicianus*. CAROLINA WREN.—Very common in all wooded parts of the swamp—in the pine barrens, along the watercourses, in the deepest and thickest 'bays,' in the hammocks, and on the isolated prairie 'heads.' The Wrens were ever present and constantly heard, yet rarely seen. On May 30 we appropriated an old cabin in which a pair had a nest with four eggs, but seldom indeed did any of us actually secure a good view of either parent. On May 4 a nest with five eggs was found at Hebardville. The young birds of another

nest, which was built in a corner on Billy's Island, left it about May 19. Many a curious call which we heard in the swamp and traced to its source, proved to be simply another note of this accomplished Wren.

70. *Sitta carolinensis atkinsi*. FLORIDA WHITE-BREASTED NUTHATCH; 'Tomtit.'—Rather common in the pine barrens, and occasionally recorded in the 'bays' and hammocks. More common in the open border land on the west of the swamp.

71. *Sitta pusilla*. BROWN-HEADED NUTHATCH; 'Tomtit.'—Very common in the pine barrens, but not confined to this habitat, for, strangely enough, we found numbers of these Nuthatches among the cypress 'heads' of Honey Island Prairie. As they hasten about in small companies, flitting among the pine needles, they keep up an incessant conversation with their dainty notes. In habits and notes they resemble the Titmice as much as they do the other Nuthatches.

72. *Bæolophus bicolor*. TUFTED TITMOUSE.—Rather common. Within the Okefinokee the Tufted Tit seems to be confined pretty closely to the swampy thickets and 'bays,' such as those surrounding Billy's Lake and bordering the Suwannee River. The birds are much given to answering each other with their loud, clear whistles, and they sometimes utter a note that is Oriolelike in quality. We found a whole family giving their Chickadeelike note as they were feeding along the edge of Mixon's Hammock.

73. *Penthestes carolinensis carolinensis*. CAROLINA CHICKADEE.—Fairly common. A few Chickadees were found in the prairie 'heads'; some were recorded in the cypress ponds on the islands and in small wet areas on the outskirts of the swamp; but most of our observations on this species were made along the lakes and watercourses. Several times the birds were noticed in groups of three or four individuals.

74. *Hylocichla mustelina*. WOOD THRUSH.—On May 9, and again on May 16, a bird was heard singing in the border of the swamp at the north end of Billy's Island.

75. *Sialia sialis sialis*. BLUEBIRD.—One of the most pleasing features of the bird life of the pine barrens is the presence of the Bluebirds in considerable numbers. A nest with young was located in a stump just off Honey Island, in the edge of the prairie, on May 13, and by June 1 young were found on the wing on this island. As late as June 18, however, birds were still nesting at Mixon's Ferry.

SUPPLEMENTARY LIST.

In view of the impending destruction of primeval conditions in the Okefinokee and the uncertainty of our making future visits to the region, it seems desirable to give at the present time as complete an account as possible of the bird life of the swamp. For this

reason the following supplementary list has been prepared. It includes the species that did not come under our own notice, but concerning which we received definite information from persons living in and about the swamp, particularly the Lees of Billy's Island. The reliability and the accuracy of these people was so amply manifested on frequent occasions that we feel no hesitation in vouching for their observations.

1. **Podilymbus podiceps**. PIED-BILLED GREBE; 'Diedapper.'—Uncommon. It occurs mainly on Floyd's Island Prairie and on the Big Water in the winter time.

2. **Phalacrocorax auritus floridanus**. FLORIDA CORMORANT.—Seen occasionally in fall and winter.

3. **Lophodytes cucullatus**. HOODED MERGANSER; 'Frog Duck.'—Common winter visitant. Sometimes it is found with the Wood Ducks on the prairies.

4. **Anas platyrhynchos**. MALLARD; 'English Duck.'—Common fall and winter visitant. The natives pointed out the hard seeds of bladderwort (*Utricularia purpurea*) as a favorite food of the Mallards and other winter Ducks. They have a 'roosting place' in the most open part of Floyd's Island Prairie.

5. **Ajaia ajaja**. ROSEATE SPOONBILL; 'Pink Curlew.'—Col. A. B. Perram, of Waycross, informed us that some years ago a well-known hunter by the name of Craven brought to his office some 'Pink Curlew' feathers from the Okefinokee. The Lees have never met with this species in the swamp.

6. **Egretta candidissima candidissima**. SNOWY EGRET; 'Egret.'—A plume-bird, called the 'Egret,' was found in the swamp twenty years ago. It was 'smaller than a White Crane, about the size of a Blue Scoggin, or larger than an Indian Pullet. Its plumes were curved, and not so long as those of the White Crane.

7. **Nycticorax nycticorax nævius**. BLACK-CROWNED NIGHT HERON; 'Redeye.'—We were told of another Heron, called the 'Redeye,' which is found in the swamp. The general description of the bird tallied well with the appearance of the Black-crowned Night Heron, and the local name is certainly appropriate.

8. **Ionornis martinicus**. PURPLE GALLINULE.—Mr. John M. Hopkins, of Hebardville, reports taking one in the swamp some years ago. The Lees probably refer to this species when they speak of 'a long-legged bird, purplish blue in color, with a red spot on the front of the head.' It is found on the prairies in the fall.

9. **Fulica americana**. COOT; 'Blue Pete.'—In the fall and winter the Coot is found on the prairies, and also among the bonnets and other aquatic vegetation of Billy's Lake, where as many as a hundred have been seen at a time.

10. *Philohela minor*. WOODCOCK; 'Snipe.'— It is not very common, but probably breeds here.

11. *Chæmepelia passerina terrestris*. GROUND DOVE; 'Mourning Dove.'— Rare. One or two are usually noted each year on Billy's Island.

12. *Circus hudsonius*. MARSH HAWK; 'Goshawk.'— We were told of a large, white-rumped Hawk, which courses low over the prairies and islands, and feeds on snakes and frogs. It goes by the name of 'Goshawk.'

13. *Halieetus leucocephalus leucocephalus*. BALD EAGLE.— Occasional. It apparently does not breed here.

14. *Otus asio floridanus*. FLORIDA SCREECH OWL; 'Scrich Owl.'— Found in small numbers in the swamp.

15. *Bubo virginianus virginianus*. GREAT HORNED OWL; 'Horned Owl.'— This is the least common Owl in the Swamp. It is occasionally noted on the prairies south of Honey Island, where one was heard during the middle of the night of May 30. It is also reported on Floyd's Island. The last specimen taken on Billy's Island was caught in a trap some ten years ago, after it had been stealing chickens.

16. *Ceryle alcyon alcyon*. KINGFISHER.— Not common in summer; more numerous in winter. On June 16 one was seen on the Suwannee River below Mixon's Ferry. Several others were recorded on Billy's Lake during June.

17. *Campephilus principalis*. IVORY-BILLED WOODPECKER.— Rare, but still existent in small numbers in the northwestern part of the swamp. The center of their distribution seems to be the group of Minne Lake Islands, which occupy an almost inaccessible position within the depths of the immense cypress 'bay' west of Minne's Lake. The natives seldom visit these islands without hearing or seeing the Ivorybills. We made three distinct efforts to reach the locality, but only on the last trip did we succeed. Then we were shown three former nesting sites of this species: the first nest, which was found occupied some six years previously, was high up in a dead cypress standing in a pondlike area near the south end of Long Island; the second was discovered about ten years ago in a large red bay in the midst of a dense cypress tangle some distance from the edge of Camp Island (upon which the Jackson Survey party camped, and hence the name); the third site was in a dead cypress in a little 'alligator lake' near the north end of Camp Island, and was occupied three or four years ago. Our guide heard an Ivorybill within the swamp beyond the last site, but the rest of our party on this short trip were not fortunate in either seeing or hearing it. The feeding range of the Ivorybills appears to be very restricted, for only on rare occasions have they been recorded as far away as Minne's Lake and Billy's Lake.

18. *Dumetella carolinensis*. CATBIRD.— This species is sometimes found in the swamp.

19. *Planesticus migratorius migratorius*. ROBIN.— Numbers come here during the winter, and occasionally a bird is seen in the summer.

We were disappointed in our hope of hearing something of old records of the Carolina Paroquet. Among the present inhabitants there seems to be not even a tradition of its occurrence in the swamp, which lies well within its former range.

NOTES ON OFFSHORE BIRDS.¹

BY JOHN TREADWELL NICHOLS.

DURING a number of years past, the writer has had opportunity to make observations from time to time on sea birds off our coast from Cape Cod southward, which, though fragmentary, yet seem worth recording in view of the scant opportunity of ornithologists to make such observations, and the consequent paucity of our knowledge of these birds.

On December 22, 1900, he sailed east-southeast from New York on a merchant sailing ship. As the coast was left behind, a few Kittiwake Gulls (*Rissa tridactyla tridactyla*) still were seen daily in varying numbers, the last being recorded January 5, 1901, 25° 57' North 37° 43' West, 2360 sea miles² east of Miami, Florida, 1350 west of the African coast, 660 further south than the species occurs on our Atlantic coast.³

On January 1, 1905, the writer was on a freight steamer off Cape Cod, making the trip from New York to Boston. A single Gannet (*Sula bassana*) seen flying close to the water off the back side of the cape is a far northern winter record for this species, which very rarely occurs as far north as New York in winter. Dovekies (*Alle alle*) were numerous, sitting on the water. As the steamer's bow approached, they would sometimes flutter along the surface, then dive below it and swim off rapidly, using their short wings as

¹ The first part of this paper was read before the Nuttall Ornithological Club.

² Distances throughout this paper are approximate, in sea miles.

³ See Bennett, *Bird-Lore*, VIII, 1906, p. 90.

The theory that the same individual sea birds, Gulls, Albatrosses, or Petrels, follow a ship day after day, is in the writer's opinion fallacious.

paddles. Kittiwakes were common, and flocks of Eider Ducks were seen about off Monomoy.

On August 7, 1906, sailed east-southeast from New York on a sailing ship. When well to sea Wilson's Petrels (*Oceanites oceanicus*) became numerous and remained so across the Gulf Stream, but had disappeared entirely before reaching 38° North 64° West on August 11, a point 335 sea miles southeast of Nantucket. A single Limicoline bird came about the ship on August 9, 39° 40' North 70° 14' West and again one on August 12, 37° 02' North 59° 27' West, and it was interesting to see this bird east of the Petrels. A broad, almost birdless area of ocean, where Kittiwake Gulls had been seen in winter five years previous, was now crossed. The first three or four days of the voyage a few Swallows were seen, the last surely identified as such on August 9, 39° 40' North 70° 14' West, 90 sea miles south of Nantucket, the nearest land. The record is of interest in view of the irregular occurrence of migrant Swallows in Bermuda.

In summer time, especially after a period of foggy weather, Wilson's Petrels often become very abundant close to shore off New York, and enter New York harbor.

On February 17, 1912, left New York for Havana, Cuba, by sea. The coldness of the passing winter was evidenced by two Holboell's Grebes (*Colymbus holboellii*) in New York harbor. Other birds of consequence were not observed until the second day, approaching Cape Hatteras, where we crossed from the shallow, cold green water to the north, to the deep, warm blue water with gulf weed to the south. Just north of this line, over the green water, the air was full of haze, and in the haze birds were numerous. There were Red-throated Loons (*Garvia stellata*), Gannets (*Sula bassana*), flocks of medium sized Alcidæ (unfortunately not identified), a few Horned Grebes (*Colymbus auritus*), and two Dovekies (*Alle alle*) were seen. On passing south onto the blue water, all these birds disappeared. A dwindling flock of Herring Gulls (*Larus argentatus*) still followed the ship, and an occasional Herring Gull was observed even from the north shore of Cuba. On February 19, 30° North 77° West (230 miles east of Saint Augustine), steaming through a wonderfully smooth sea, an Audubon's Shearwater (*Puffinus lherminieri*) appeared gliding close to the water, gave

its stiff, narrow wings a few quick flaps, and slid out of sight behind a swell.

Coming north from Havana, Hatteras was passed after dark, so that the bird life there was not observed except that Herring Gulls became tolerably common and three Gannets were seen on blue water with gulf weed just south of that cape. March 11, 32° 30' North 77° 00' West (145 miles east of Charleston) several Puffinidæ, about ten in all, were seen. They were wild and none came near enough to the steamer for a satisfactory view, but they were noted as probably Greater Shearwaters (*Puffinus gravis*) and I marvelled greatly that this species should be found off Hatteras at a season when it would have been expected to be just finishing its breeding in the southern hemisphere. In the light of later observations, these birds were very likely the Black-capped Petrel.

January 23, 1913, left New York for Havana by steamer. It was interesting to contrast the birds of an unusually warm winter with those observed in 1912. A single Bonaparte's Gull (*Larus philadelphia*) was seen in New York harbor, and two Gannets were observed outside, the first probably about ten miles south from Sandy Hook. On the Cape Hatteras grounds Gannets were numerous, but a single Loon and perhaps one or two Alcids were in contrast to the many birds seen here the year previous. Herring Gulls also were not noted as far south, the last being seen the day Hatteras was passed. On January 25, 31° 48' North 75° 58' West (250 miles east of Savannah), on blue water, alternating sunny and showery with a little lightning, the steamer butting into a brisk southwesterly breeze, a sharp lookout was kept for Puffinidæ, as they had been seen near this latitude the year before. Once or twice thin vanishing vertical shadows against the myriad horizontal wave shadows of the distance lead me to believe there were some of these birds about, and as I stood by the port side forward, looking towards the bow, a Black-capped Petrel (*Æstrelata hasitata*) darted away to the eastward above the waves, and I had a splendid view of its long, narrow, stiff wings, blackish cap and back, black tail, white side of neck underparts, lining of wings and upper tail coverts. First one then the other wing uppermost, it was shooting across the wind with almost unbelievable speed and soon out of sight among the distant seas. An Audubon's Shearwater, which

appeared in the trough of a sea near the vessel almost immediately, was noticeably smaller than the first bird. Two or three other birds, obviously Puffinidæ, were seen later in the day, but these were the only ones which came within fair binocular range. The flight and appearance of the Black-capped Petrel were very much like those of the Greater Shearwater. The distinguishing large amount of white over the tail was conspicuous.

January 26, 27° 18' North 79° 40' West, approaching the Florida coast, two or three Audubon's Shearwaters were seen; and January 27, 24° 20' North 81° 10' West, crossing from Florida to Cuba, they were common, but none were seen on the Cuban side of the Straits. I quote from my notes, "Blue water; practically no gulf weed. Wind moderate, 45° on our port bow. The Shearwaters were mostly flying parallel with the ship at about her speed, off her leeward bow. They crossed the bow from time to time and flew up to windward; apparently they had been flying into the wind, planning to pass in front of the ship, and did not allow for her progress. None were seen behind the ship or amidships to windward. They flew very close to the water, flapping a great deal, the sails much abbreviated. Sometimes one would half light and, with wings extended, kick itself into the air again with its feet against the water. Their rather long tails were noticeable.

Coming north from Santiago de Cuba on February 1, passing the Bahamas, a single Tropic Bird was seen 24° 40' North 74° 30' West, and two or three Puffinidæ in the distance were probably Audubon's Shearwater. February 2, 28° 35' North 74° 35' West, cloudy with fresh east-northeasterly wind, blue water and gulf weed, by watching diligently saw one Black-capped Petrel (*Estrelata hasitata*) which flew along with the vessel for a few minutes off her starboard quarter. It resembled the one seen on January 25, but was not so close to the ship. Noted the white underwing surfaces, long wings, and conspicuous white wedge of the upper tail coverts. The first Herring Gull appeared February 3, 33° 45' North 74° 35' West, but these were not common until the next day. We were coming north further off shore than the Havana route, which perhaps accounts for the fact that a number of Kittiwakes (*Rissa tridactyla tridactyla*) were seen February 4, in the morning, 37° 46' North 74° 10' West (85 miles east of Maryland). They were absent after that until about sunset, when we were getting close

to New York, and a few of these gulls as well as several Gannets and one or two Dovekies were observed.

The following seem to be the most noteworthy generalizations which can be made from these fragmentary observations:

The Kittiwake Gull (*Rissa tridactyla tridactyla*) winters at sea across the mid-Atlantic, much farther south than on our coast, where it is found in numbers only as far south as New York, and probably a few to Hatteras.

The Gannet (*Sula bassana*) winters as far north as the Hatteras grounds and northward in diminishing numbers; very rarely to New York, stragglers sometimes off Cape Cod.

The Audubon's Shearwater (*Puffinus lherminieri*) occurs commonly off our southern states in winter, not far south of its coast-wise summer range.

The Black-capped Petrel (*Æstrelata havitata*), is not extinct and occurs off our southern states, observed in winter northward and eastward of the Audubon's Shearwater.

Alcidæ and Red-throated Loon (*Gavia stellata*) in severe winters occur south off the coast in numbers to the Hatteras grounds; in open winters they are less plentiful southward.

The Problem of the Sailing Bird.

There has been some discussion of late as to what forces are utilized by the sailing bird and how they are utilized, perhaps sufficient to serve as excuse for offering the following explanation here, even though, being in the writer's opinion the true one, and quite simple, it very probably has often been stated before.

Let us take a simple, striking case of the phenomenon, and one not complicated by local conditions as cliffs or mountain ranges and their accompanying vertical air currents. An Albatross has been resting on the water during a calm spell (as is the custom with these birds); when a fresh wind springs up he launches himself in the air with much flapping and kicking of the water (again customary) and when well started, sails across the wind on stiff, motionless wings (again customary).¹ His wings are tremendously long and narrow; his big feet extended backward reach just beyond

¹ See Fisher, Bull. U. S. Com. Fish. for 1903, p. 23. The apparent difficulty of the Albatrosses here discussed to cross the wind may rather be explained as difficulty of turning short into or loss of relative momentum before it.

the end of his stumpy tail, which seems not to balance his big neck and shoulders. As he goes he leans far over, first to one side, then to the other. Now the tip of his lower wing actually cuts a knife-like furrow in the water, now he swings high into the air on a great bow. At first sight you say, of course the wind is the motive and supporting force. But on trying to explain how it is such, difficulties are apt to be experienced, and you would perhaps fall back on the theory that the bird utilizes rising air currents, except that this theory *does not satisfactorily explain the observed facts*, for the bird seems to go where it chooses and everywhere find the right air currents. So universal a distribution of rising currents will not meet the test of probability. It is believed that the difficulties spoken of come from trying to apply the force of wind always to the under side of the bird's wings and to brace it against gravity, whereas in fact it is commonly applied to the upper surface in gaining momentum. In order to use this force, the bird must oppose it to a comparatively rigid resistance, as that of the water against the flat side of a sailboat's hull. In the compressed air beneath him he finds just such a force, familiar enough to us as holding up parachutes etc., and it is significant that the sailing Albatross holds its wings somewhat downward, which would help them to function as a parachute. By raising or lowering and turning his head, he may steer readily with this bow rudder and maintain or increase his elevation by directing his course slightly upward through the air. It is an observed fact that he turns toward his lower wing, and doubtless leaning to the side is the important factor in steering to one side or the other. When his course is held upward by pressure of air on his breast and lower head, and at the same time he is being propelled forward by pressure on the upper side of his wings, obviously a very long wing is an advantage, which we find to be the type of wing possessed. It will be noted by our hypothesis that all forces being braced against the upward parachute pressure of the air beneath the bird's wings, the downward pressure opposed to it must be considerable, and the density of the air increasing with the pressure, the sailing bird rests on an invisible cushion of dense, compressed air. As he moves forward, fresh air is feeding into this cushion in front and an equal amount escaping from it behind, but the current through it is slight as in a lake though with inlet and outlet. Braced against this air cushion, the

Albatross can maintain his momentum by utilizing gusts of wind, merely turning his upper surfaces to its impact, or swooping down from time to time. If by inadvertence he does lose this momentum,—begin to drift (frequently observed in light and moderate breezes)—he can readily regain it by a few flaps of his wings (commonly observed in such cases). Care should be taken not to consider the upward parachute pressure of the air a force, for it is a resistance, not to confuse it with the pressure of the wind, and not to draw false analogies between an object in compressible air and one in non-compressible water. The above hypothesis will explain sailing close to the wind as well as across it. There are doubtless complications and adjustments which it does not cover, just as sailing birds doubtless experience and utilize more or less vertical currents which may at times make easier, but do not in general explain their sailing. It is also a conservation hypothesis in that it allows for a bird's shooting a long distance in still air by utilizing, instead of opposing, its elasticity.

As corollary we would expect Albatrosses, Shearwaters, circling Gulls and Hawks to attain their greatest velocity with their upper surfaces inclined to the wind. That my memory fails me as to whether or not they do so, shows how meager our observations often are without a theory to direct them. In a way it is an advantage to draw up the hypothesis without these observations, as then when made they will be new facts to test it by.

The compressed air hypothesis does not preclude a bird's being lifted by the wind below its wings while losing momentum, nor of its attaining momentum by being braced upward against the air pressure, if its wing be flat and firm enough to meet perpendicular resistant air pressure above, which the wings of most birds probably are not, though quite capable of utilizing the glancing impact of the wind. A bird with a wing which would admit of the former would be expected, in its ordinary flapping flight, to raise its wing edgewise, turn it and bring it down flatwise. It is possible that Shearwaters do fly somewhat in this manner, and that it explains a certain stiffness which has been observed in their motions.

In conclusion it is quite possible for a bird to utilize the wind by bracing it against more or less vertical air pressure, and vertical air currents are unnecessary as they are ineffectual in explaining its sailing.

MORNING AWAKENING AND EVEN-SONG.

SECOND PAPER.¹

BY HORACE W. WRIGHT.

So interesting had the procuring of definite data upon the subject of morning awakening and even-song become, that I was again moved in the season of 1912 at Jefferson Highland, New Hampshire, to obtain more records for comparison with those which had been procured there in former seasons and had served as the basis of my first paper.² The fifteen records which were then brought together had all been taken from one position, namely, the lawn with extended open space on either hand and the mountain side partially covered with mixed timber growth across the road. Here the awakening of the birds of the open country, the roadside, and the wood border had been recorded, but it remained to take position within the woods among the songsters resident there, and obtain records of their first songs. To effect this five records were taken in the midst of the fifty-acre piece of woodland lying between our buildings and the river and four others where in its lower extension it is bordered by a large field. In these locations I was brought near to some other species than those within range of hearing on the Highland. Nine other records were also procured in the former position on the lawn and at the gateway for the purpose of comparison with those previously obtained. On all occasions I was upon the chosen ground some time before the first song or call-note was given, so that I was assured that the earliest note had been heard; the time of waiting ranged from ten to thirty minutes; on many occasions it was fifteen minutes.

By these new records most of the statements of the first paper have been confirmed. Others require some modification. The flycatchers, the sparrows, and the thrushes still prove to be the earliest awakening birds, and the warblers as a family follow these. But the new positions taken, namely, in the heart of the woodland

¹ Read before the Nuttall Ornithological Club, March 17, 1913, and revised in accordance with additional records obtained in the season of 1913.

² Auk, XXIX, No. 3, July, 1912, pp. 307-327.

and also in its lower reaches near the river and its border by the open field, furnished much earlier awakenings of the warblers than had been my experience on the lawn and at the roadside, where the birds were heard at longer range. The new positions taken were also near the Olive-backed Thrush, the Veery, and the Indigo Bunting, and furnished records of Scarlet Tanager, Blue-headed Vireo, Winter Wren, Golden-crowned Kinglet, and Red-breasted Nuthatch at near range.

As something is gained by closely followed up experience in the way of overlooking no voices and in enabling the ear to reach out sensitively and hear every song uttered, it proves that in the case of some of the species recorded in the first paper, besides the warblers, an advance of some minutes in the time of first song has resulted. The loud singing of several near Robins introduces a difficulty in taking all records in the open near the house, as it tends to drown out the quiet earliest utterances of other songsters. For my experiences within the woodland and at its lower border, where the voice of Robin has scarcely been heard, show that nearly all the species resident there sing earlier than their songs have been heard on the Highland, where the voice of the Robin prevails so strongly. What was expressed in the first paper concerning the order of awakening of Song Sparrow, Chipping Sparrow and Robin is further substantiated by the records of 1912 and 1913, namely, that while the Robin is the earliest conspicuous singer by reason of its loud and continuous singing, yet the Song Sparrow and the Chipping Sparrow precede the Robin in several expressions of song, which must be regarded as morning awakening singing rather than as night utterances, the latter usually being only a single expression from a single bird, while the songs of awakening follow at intervals and come from several individuals.

The records within the woodland and at its lower border, where Wood Pewee and Alder Flycatcher are resident respectively, show that these flycatchers are the earliest of all the early songsters and give them first and second places in rank. Similar results were not obtained outside the woodland, so that these species were given a lower ranking in the first paper, based on records at longer range. The Oven-bird also is now ranked by its quite usual early flight song, which is so regularly given that it will not do to

overlook it as an expression of morning awakening, although it is often followed by only one or two repetitions, or by none at all, within the next forty or fifty minutes. Then the species begins to sing its usual song at the time of the other warblers. The Indigo Bunting also has been found to better the time previously named, when heard at close range. The Olive-backed Thrush, always recorded in former seasons at long range from my position in the open, is now ranked from the several hearings within the woodlands at closest range. And the warblers, now scheduled by their first songs heard at very close range, all prove to be earlier songsters than was indicated in the first paper, although they are still found to awake comparatively late, the earliest, Maryland Yellow-throat, being preceded by twenty-two species and not singing until eighteen minutes after the Robin, and the next earliest, Chestnut-sided Warbler, not singing until eight minutes later, or twenty-six minutes after the Robin. Many additional records of the Crow show that it retains about the same relative place, namely, as the thirtieth species in the order of awakening.

The records of 1912 which have been brought together were obtained between June 20 and July 15 inclusive. One in each of the several locations will be given as illustrative of the respective order of awakening therein. Three records were taken in the heart of the woodland. One of these is: July 6, sunrise at 4.09; out at 2.21; weather fair, wind northwest calm; temperature 70°; moon in last quarter shines out clear. Await on bench by stable some first note. Frogs croak in pond-hole some distance away. Enter wood with lantern at 2.39 and proceed down the footpath. There has been no note of any kind outside the wood. Reach bench where I seat myself at 2.44; no note yet of any kind within the wood. There is only the soft music of the streamlet near by, and occasionally the sounds of a mouse running over the leaves on the ground. At 2.47 Wood Pewee sings once; again, 2.51; Oven-bird gives flight song, 2.53, nearby, without leaving perch, I am quite sure; Wood Pewee, 2.56, sings four times, and at 2.58 sings and continues; 3.04, no thrush note yet; 3.05, second Pewee sings, and the two continue, singing constantly; Olive-backed Thrush gives whistle call, 3.12, then querulous call and sings at 3.13; second bird immediately gives "pep" call and sings; at 3.15 three Olive-

ocks are singing and continue their song; at 3.20 second Oven-bird gives a flight song; at 3.23 a Veery is heard calling in the distance; at 3.24 Black-throated Blue Warbler sings; at 3.25 Blue-headed Vireo; at 3.27 Red-eyed Vireo, very quietly, but is well heard; at 3.28 Wood Thrush sings, no previous calls having been heard; Blackburnian Warbler, 3.32; Parula Warbler, 3.34; Golden-crowned Kinglet, 3.36; at 3.38 the Wood Thrush has sung but little, but is singing freely now; Oven-bird's first usual song, 3.46, and it is continued; Wood Thrush still singing, 3.48; Crow's first call, 3.51; Redstart sings, 3.53; Black-throated Green Warbler also, 3.53; extinguish lantern, 3.58; emerge from the wood at 4.04 o'clock. Two other records obtained in the same location on July 9 and 15 are in their main features similar. The three records include sixteen species. Wood Pewee was first in each instance. The second place is taken by Oven-bird with a flight song, if the records be averaged. Veery ranks third. Olive-backed Thrush comes fourth, followed by Scarlet Tanager. The sixth and seventh places are taken by Blue-headed Vireo and Black-throated Blue Warbler respectively. Wood Thrush is eighth. The next four places are filled by Red-eyed Vireo, Blackburnian Warbler, Golden crowned Kinglet, and Parula Warbler. The Crow with its call is thirteenth and Black-throated Green Warbler, fourteenth. Sapsucker and White-breasted Nuthatch, each on a single occasion, closed the record. The July 15 record, taken when the sun rose seven minutes later than on July 6, shows a somewhat later awakening into song than the difference in time of sunrise, indicating that as the season advances to the middle of July there is a disposition to delay awakening, as the spirit of song is already waning. The weather conditions were similar on the three mornings, and all the circumstances under which the records were obtained were alike.

On four other mornings I passed down through this same woodland a mile, more or less, to a position near its border, that I might be among another and different group of songsters. The woods terminate on this, the western, side in four or five acres of saplings and bushes with only occasional large trees, this section having been cut over within a few years. It is favorable, therefore, for wood-border and bush-dwelling species. A lantern was needed to show the trail and conduct safely as well as for making the rec-

ords, and a somewhat earlier start was necessary for covering the distance. One of these records taken within the wood near its border may serve for illustration of the awakening in that location. July 2, sunrise 4.06; out at 2.25; morning fair, wind south, light; temperature 53°. Woods were entered at 2.29. No note had been heard outside, and it is silent within. Reach position at 2.44, hang lantern on a tree, and wait. Not a note from anything on the way down, nor sound of any bird moving on its perch among the branches. Evidently neither the presence of the lantern in the wood nor my movement along the path tend in any way to disturb or arouse the bird occupants. And when a train has moved noisily through the valley, as has sometimes happened before awakening time, it plainly has no effect upon the still sleeping birds. They obviously bide their time with reference to the break of day and are not responsive to factitious lights or incidental sounds. At 2.45 a cock crows in the distance; at 2.54 an Alder Flycatcher sings once; at 3.01 a Song Sparrow gives a beautiful "flight" song without leaving its perch, I think; a second Song Sparrow sings immediately; a third one farther away sings at 3.04; an Oven-bird gives flight song at 3.05; immediately following the Oven-bird's outburst, a White-throated Sparrow close by in full, clear voice gives first three notes of its song; at 3.07 a Vesper Sparrow sings in the big field just beyond the wood border and continues its singing; Oven-bird sings a second time at 3.09; Indigo Bunting gives full song, 3.10, and continues; Olive-backed Thrush gives "pep" call, 3.10, and sings, 3.11; another immediately sings, and the two continue indefinitely; soon a third bird sings; Hermit Thrush is heard singing some distance away at 3.14, more clearly at 3.15; Wood Thrush's voice at 3.16; Junco's 3.18; White-throated Sparrow sings again, 3.19, and continues, three notes of the song only; Oven-bird sings again, 3.22; Veery calls, 3.24; Magnolia Warbler sings, 3.26; Red-eyed Vireo, 3.29; Canada Warbler, 3.30; Chestnut-sided Warbler, 3.30; second bird, 3.31; Redstart, 3.32; Parula Warbler, 3.34; Blackburnian Warbler, 3.37; Black and White Warbler, 3.41; Oven-birds begin to sing frequently in regular way, 3.45; Crow's first call, 3.52 o'clock. Start back up the path at 3.55; every bird is freely singing. The new voices are those of Black-throated Blue and Black-throated Green

Warblers, of Golden-crowned Kinglet, Blue-headed Vireo, and Wood Pewee. Purple Finch is not heard until 3.59, and Red-breasted Nuthatch until 4.15, although I had been within hearing earlier. Leave wood at 4.23 o'clock. On July 4 a second similar record was obtained in the same location.

Two other records were taken on July 8 and 12, when the position chosen was just outside the woodland and within the big field. One of these will serve for illustration. July 8, sunrise 4.11; out at 2.18; fair, wind south; temperature 70°; small waning moon bright. On the ground at 2.35. Not a sound of any kind along the way. At 2.38 a Song Sparrow sings once; up to 2.48 no other note; light of dawn is now quite apparent; at 2.49 Alder Flycatcher sings once, and again at 2.52 and 2.54; Song Sparrow gives second song at 2.55 and sings again at 2.59; Vesper Sparrow sings, 2.55, and again at 3.00, 3.01, and 3.03; at 3.04 the Vesper's is the only constant voice; Oven-bird gives flight song at 3.05; second bird is heard in flight song at 3.08 and 3.15; Indigo Bunting sings, 3.08; Wood Pewee, 3.09; the voices of Alder Flycatcher and Vesper Sparrow are constant now; Hermit Thrush's nasal call is heard, 3.10 (time of song inadvertently not recorded); Olive-backed Thrush's call, 3.11, and song, 3.12; Veery calls, 3.13; Scarlet Tanager sings, 3.16; Maryland Yellow-throat once at 3.17, again at 3.19 and continues; White-throated Sparrow, 3.19, full song, two birds singing; Savannah Sparrow, 3.20, and continues; Chipping Sparrow, 3.21; Junco, 3.25; Mourning Warbler, 3.28; Canada Warbler, 3.29; Chestnut-sided Warbler, 3.30; now there is a full chorus; Black and White Warbler, 3.36; Crow calls at 3.40; Red-eyed Vireo sings, 3.43; Winter Wren, 3.48, not earlier, as I had been listening with care for the song; is constant in song after first heard; Sapsucker calls at 3.58, as it clings to a hemlock; leave field at 3.59, closing the record.

The four records taken near the lower border of the wood and at the edge of the big field show that the Alder Flycatcher is often the first bird heard, as in the midst of the woodland the Wood Pewee was first on each occasion; that Song Sparrow is usually second, when not first, with a single song followed by repetitions rather infrequently, a second bird often singing immediately or very soon after the first and also giving repetitions of its song

rather infrequently; that Wood Pewee ranks third; that the Oven-bird is often fourth with a flight song which may be given a second time somewhat later, but that it is much later when the usual form of song is sung and repeated frequently; that Vesper Sparrow often ranks fifth, when not ahead of the Oven-bird's early flight-song; that Indigo Bunting is next in the order, but is sometimes preceded by Olive-backed Thrush or Hermit Thrush; that the latter is not lower than the eighth in rank and sometimes ranks higher, being accustomed to call for some time before singing, at least five minutes and sometimes ten, and, therefore, in respect to song taking a lower place; that the White-throated Sparrow often ranks next, although sometimes much higher, being less certain to take a definite position among the early songsters than they, having been on one occasion fourth and on some others below the ninth; that the Junco sometimes ranks closely with the White-throat; that Veery and Wood Thrush may follow next as eleventh and twelfth without being entirely reliable members of the chorus; that Scarlet Tanager sometimes occupied a place very close to the last-named thrushes; that Maryland Yellow-throat comes earliest of the warblers, if Oven-bird be excepted in its early flight song; that Chipping Sparrow and Savannah Sparrow in the open fields have filled the next places, not heard, however, in their first songs, as later experience has shown; that Red-eyed Vireo ranks seventeenth, but sometimes takes a lower place among the warblers, some of which are likely to be heard earlier than Red-eye; that then follow eight warblers in rather close ranking, but according to the local records in this order: Redstart, Chestnut-sided, Magnolia, Parula, Mourning, Canada, Blackburnian, and Black and White, the range of time being eight minutes; that the Crow takes the twenty-sixth place as heard from the wood border; that the Winter Wren does not sing until almost all the warblers have sung, four records varying but eight minutes; that the Sapsucker ranks last, taking the twenty-eighth place at ten minutes before sunrise.

Still other two records were procured in the same locality on July 18 and 27, but as these dates proved rather late in the singing season for obtaining satisfactory results, the records have not been used in drawing up the averages which are submitted in tabulated form.

Nine records were also obtained upon the lawn and at the gateway in similar manner to those which formed the basis of the first paper. One of these is presented in detail. June 20, sunrise at 4.02; out at 2.34; sky partially clouded, but some stars shining; wind south calm; temperature 52°. Glimmer of dawn is apparent. Complete silence reigns, excepting the distant sound of the flowing river in the valley. Up to 2.46 no note has been heard. At 2.47 Song Sparrow sings once; at 2.55 Chipping Sparrow gives a long trill; at 2.59 light has increased a little; at 3.00 Robin calls and a minute later sings, quietly at first; at 3.04 the same Song Sparrow sings once, and again at 3.05; at the same time a second Chippy trills once; at 3.06 a second Robin sings; at 3.08 Hermit Thrush sings; at 3.09 a third Robin, and the three continue singing; at 3.11 Song Sparrow repeats song again and again; Vesper Sparrow sings, 3.12; Tree Swallow at the same time begins its joyous flight which is continued for an hour or more; at 3.13 and 3.15 Chippy repeats trill; second Hermit is singing, 3.16; at 3.18 Indigo Bunting sings several times, and the first Chippy is singing constantly; Junco sings, 3.19; Savannah Sparrow, 3.20; Bluebird, 3.21; at 3.24 extinguish light of lantern; Olive-backed Thrush sings, 3.26; pair of Chipping Sparrows drop to the driveway at 3.30; four Chippies and three Robins are now singing; second Indigo Bunting sings, 3.30; second Junco, 3.31; Crow calls from the mountain side at 3.34, two or three times only; another Crow calls in the valley, 3.38; Red-eyed Vireo sings, 3.39; Wood Pewee is heard singing at 3.40, but must have sung much earlier; two Crows on the wing, 3.41; Oven-bird's first song, 3.42; Redstart in frequent song, 3.43; several Red-eyes are singing, 3.45; Robins have ceased to sing, 3.47; a bit of rosy light on clouds in the east, 3.49; Oven-bird is now heard again and again; Black and White Warbler sings, 3.55; Goldfinch calls passing in flight, 4.04; half a dozen species follow, but the songs are not regarded as their first; so the record is closed two minutes after sunrise. It has been found that first songs or calls which have not been heard until sometime after sunrise are seldom really first songs or calls, these having been lost through distance of range. So awakening records have been closed at sunrise or shortly thereafter.

A second record on June 23 under similar conditions of weather,

when Mr. Richard M. Marble recorded the awakening with me, shows that a Song Sparrow sang once at 2.45; that a Chipping Sparrow trilled once at 2.46, followed directly by a second bird; that Song Sparrow sang again at 2.52, and a second bird twice at 2.54; that the first Robin gave a few notes at 2.54 and began to sing freely at 3.04, a second Robin beginning to sing one minute later; that Veery first called at 3.05 and sang at 3.11; that Kingbirds gave a few calls at 3.07; that Alder Flycatcher sang at 3.09; that Tree Swallow was in song flight at 3.10; that Vesper Sparrow sang at 3.11, and Bluebird at 3.12 o'clock. The record then continues in quite the usual way. On June 26, 29, July 7, 10, 13, 17, and 28 similar records were taken. The last two have not been incorporated in the averages, because they were too late in the singing season for satisfactory results.

And an occasional individual record in the illustrative records which have just been presented has not been made use of, because not in harmony with the series of records of the species. Some censorship of this kind is quite necessary when a series of records is examined, as it sometimes happens that a late record can be accounted for by the fact that the bird was not near enough to be heard in its first songs. Experience must be availed of in deciding such questions.

The period within which all the records were obtained, which have been combined, extends from the time of earliest sunrise, which is 4.02 o'clock at Jefferson, to the time of sunrise at 4.16 o'clock; the variation in sunrise, therefore, is fourteen minutes. Had it been possible to procure the desired records between June 7 and 22, there would have been no variation in the time of sunrise to reckon with. As it is, an exact basis has been established by adopting the number of minutes before or after sunrise on each day of record for the time-record of each first song and by averaging the times on this basis. The clock-time when a species awakes to sing can thus be determined for any date. I have also averaged the clock-times, as taken by the watch, of first songs of each species throughout the series of records of each to obtain the average clock-time within the prescribed period. But this is not an unvarying basis, since it varies according to the dates of records; for it makes a difference whether the records of a species are ob-

tained wholly in June on days of earliest sunrise or wholly in July on days of later sunrise. For instance, seventy minutes before sunrise on June 20 is 2.52 o'clock, while on July 15 it is 3.06 o'clock. A series of records in June would, therefore, be at an earlier hour by the watch than a series of records in July. Many species included in the list have both June and July records, but two or three have only or mostly June records, as Phoebe, Kingbird, Tree Swallow, and Bluebird, while several residents of the woodland have only July records. The clock-time named for the former, therefore, is relatively earlier than the time named for the latter. Thus the clock-record assigned each species as to first song is not so exact as the number of minutes before or after sunrise, which is exact and definite for any date. So on the latter basis the species have been ranked in the table of awakening which follows. This was not done in the first paper, but the variation in time of sunrise was regarded as negligible. I find that it should not be so regarded, if one would attain accurate data.

The weather conditions were very uniform throughout the period in which the records of 1912, which have been combined, were taken. Every morning was fair and without wind. The June days were somewhat cooler than the July days. In the earlier part of June the weather had been continuously cold with frosts on the eighth and tenth days. There was much cloudiness with frequent rains, and winds were prevalent. A hot dry spell began on July 2 and continued to July 18, modified somewhat after the tenth day. Little rain fell. The conditions up to June 20, therefore, were unfavorable for obtaining satisfactory records, but on and after that date they were very favorable. In the season of 1913 propitious weather came earlier, and the records, sixteen in number, were obtained between June 8 and July 9 inclusive.

The view was expressed in the first paper that it seemed not unlikely that bright moonlight had no effect to awaken earlier the early-singing birds. Later experiences modify somewhat this view, as on June 19, 1913, the morning after the fulling of the moon, when it shone brightly at the time of morning awakening, some of the earliest-awakening birds made a demonstration unusually early. The Tree Swallow was in the air in song flight at 2.15, forty minutes or more before his customary time; a Kingbird passed

in flight singing at 2.58, winging his way some distance, twenty-four minutes earlier than he awoke on two other near occasions; a Robin began to sing at 2.41, sixteen minutes earlier than his next earliest awakening; and a Hermit Thrush broke into song at 2.59, six minutes earlier than on any other morning. The other earliest-singing birds, however, were scarcely influenced, for Song, Chipping, Savannah, and Vesper Sparrows, Alder Flycatcher and Phoebe sang no earlier than upon other occasions when the sky was only starlit. It was an early morning for the Crow, however, for its first calls were heard at 3.17; but among nineteen records there are five others also unusually early, one occurrence being on June 10, when calls were given at 3.10, on which date the moon was in the first quarter and had set at midnight. Therefore there appears to be no generally exerted influence of the moon to awaken the birds earlier than their wont, while it seems upon the morning named to have had an influence upon the few individuals specified. It could produce an effect only upon the earliest awakening birds, if upon any, for the light of the unrisen sun is always pervasive before the later birds awake to sing.

The view was also expressed in the first paper that cloudy conditions appear not to have had an influence to any extent in delaying the time of early song. Further experience mostly confirms this view. But occasionally there is a definite exception. On July 7, 1913, the awakening was late. The previous evening having been fine, I rose for an awakening record and proceeded half a mile into open country. The sky was clouded. A change to lower temperature had been inaugurated in the night. The morning was dull and cold, and such was the day throughout. Position was taken for the record at 2.42; it was 3.10 before the first Song Sparrow sang, eighteen minutes later than the average time. The song was repeated at 3.14, and a second bird sang then. It was 3.24 before a Vesper Sparrow was heard, nineteen minutes later than usual. Chipping Sparrow did not sing until 3.31 and Phoebe until 3.33 o'clock. No voice of Robin was heard before 3.43. This was the record just where the record of June 19 had been taken when the moon filled the sky with light and some of the birds awoke so early as to break all records. I think the delay was rather more due to a chilly morning introducing forbidding

weather for the day than to a cloud-spread sky. For when the air is soft and the day is to be comfortable and agreeable although clouded, the birds have often been as early to awake as on a starlit morning. Such a morning as has been described is usually avoided for obtaining a record, as it is sure to prove not representative. And even throughout the day song is much diminished. While upon warm, agreeably clouded days the birds are wont to sing especially freely.

The order of the tabulated list is the result of combining the records obtained in the four respective locations, as described, and in other near locations in the season of 1913. I should not expect another series of similar records to give entirely the same results, for local conditions and something of individuality in the near resident birds would be likely to modify the record season by season. But a series of records such as has been procured may fairly be regarded as representative and correctly indicating the general order of awakening. Without exact time-records throughout the prosecution of the work there would be no reliable data for general facts and deductions. These are manifestly the results which are of interest and value, since thereby we attain some definiteness to the whole order of the awakening, which is not invalidated by such variations as may occur once in a while and effect to change somewhat the relative position of a species. For notwithstanding some variance in relative position which a number of records may show, there is a general trend in the order of every awakening which is definite and fixed. The first nine species in the list are always the first nine with infrequent exceptions, and they awake to sing more than an hour before sunrise. The resident flycatchers are always very early; some of them are likely to be the earliest. Song Sparrow and Chipping Sparrow are with few exceptions the earliest sparrows. White-throated Sparrow is next earliest. Robin usually follows after these earliest flycatchers and sparrows. Oven-bird sometimes precedes them all with one or several flight songs. Barn Swallow and Tree Swallow also are very early. All other members of the flycatcher, sparrow, and thrush families which are present, twelve species in all, follow in the next fifteen minutes, or from an hour to three-quarters of an hour before sunrise, the Wood Thrush, however, proving by a single

season's records to be somewhat later, and Purple Finch and Goldfinch later still. Black-billed Cuckoo and Scarlet Tanager also rank among these. The two resident vireos with all the warblers voice themselves after the flycatchers, the sparrows, the swallows, and the thrushes, except Maryland Yellow-throat and the Oven-bird in its early flight songs. The warblers awake in quick succession when their time arrives, which is not until twenty-six and thirty-five minutes after the Robin and the Song Sparrow respectively; so thirteen species of warblers are found to awake and sing within seventeen minutes of one another,—eleven of the species within eleven minutes— or, from thirty-eight to twenty-one minutes before sunrise. The Crow's first call comes somewhat midway among the warblers' first songs at thirty-four minutes before sunrise. The Purple Finch's first song is at the same time. Golden-crowned Kinglet, Winter Wren, Chickadee, and Red-breasted Nuthatch are first heard among the latest warblers. Cliff Swallow is forty-four minutes later than the Barn and Tree Swallows; House Sparrow a few minutes earlier than the Cliff Swallow. Goldfinch follows at only a few minutes before sunrise. Bobolink usually waits for sunrising. Cedar Waxwing, Belted Kingfisher, and Chimney Swift commonly remain silent until the sun is risen. White-breasted Nuthatch and the woodpeckers also have not been heard until after sunrise, with the exception of the Sapsucker and sometimes the Pileated Woodpecker, nuthatches and woodpeckers usually taking place at or near the end of the awakening list. This general order one who has some familiarity with morning awakenings may confidently look for, as he moves forth at break of day, and he will not be likely to find many wide departures from it.

The occasional early songs of Song Sparrow and Chipping Sparrow, infrequently uttered, but quite regularly given, preceding the singing of the Robin, give these sparrows rank in advance of the latter. Mr. Francis H. Allen in his paper, entitled, "More Notes on the Morning Awakening" ('The Auk,' XXX, April, 1913, p. 229), takes a different view, regarding these early occasional songs as songs of the night and not of morning awakening. The record of June 23, 1912, may serve to illustrate the reason of my view: Song Sparrow sang at 2.45, 2.52, 2.54, 2.55, and 2.57;

two Chipping Sparrows sang at 2.46; a Robin gave a few notes at 2.54 and began to sing freely at 3.04 o'clock. The record of June 10, 1905, may further illustrate the position taken: Song Sparrow sang at 2.40, 2.48, 2.55, and a second bird at 2.57; Chipping Sparrow sang at 2.48; two Robins began to sing simultaneously at 3 o'clock. And the record of July 9, 1906, may be given as a third illustration: Song Sparrow, 2.54 and 3.05; Chipping Sparrow, 2.58 and 3.05; Robin, 3.08 o'clock. The records of 1913 furnish similar testimony. On June 8 a Song Sparrow sang at 2.58 and a second bird at 2.59; Chipping Sparrow sang at 2.59 and a second bird at 3.09; Robin sang at 3.02 and a second bird at 3.10 o'clock. On June 21 a Chipping Sparrow sang at 2.34, a second bird at 2.52, and the first bird again at 2.57; Song Sparrow sang at 2.54 and a second bird at 2.55; Robin sang at 3.01, a second bird at 3.08, and a third bird at 3.12 o'clock. On June 23, in a different location from June 21 and a half-mile distant, a Chipping Sparrow sang at 2.34, again at 2.53, and a second bird at 3.01; Song Sparrow sang twice at 2.43, a second bird at 2.47, the first bird again at 2.54, and a third and a fourth bird at 2.56; Robin began to sing at 2.58 o'clock. One other supporting reason for the view that the very early songs of Song Sparrow and Chipping Sparrow are true songs of awakening may be named. The infrequent repetition of earliest song in the awakening is characteristic also of even-song, for the records show that the last songs are often given at long intervals and the final one or two renderings may be many minutes after the next preceding. This is characteristic also of the Savannah and White-throated Sparrows only to a less degree, for these also commonly give a song or two in awakening some minutes earlier than they come into constant song. The Vesper Sparrow on the contrary usually takes up free singing promptly after its first song.

A marked exception on one occasion, July 1, 1912, was a Robin beginning to sing at 2.38, or 88 minutes before sunrise. This bird continued its song for 66 minutes, or about 20 minutes longer than is the usual period of first song. A second bird, beginning to sing at 3.07, paused at 3.53, or after 46 minutes of song, that is, within the usual time limits. I have regarded this instance as an exception and not included the record in drawing up the average time of first song of the Robin, since among many records in the

season of 1912 and in former seasons there has been no similar instance. Usually a second and a third Robin sing from one to seven or eight minutes after the first bird. The full records of 1913 further confirm the priority of Chipping Sparrow as well as Song Sparrow. Eleven records of Song Sparrow average 77 minutes; ten records of Chipping Sparrow, 67 minutes; and nine records of Robin, 63 minutes. Complete records of the three species, twenty-eight in number, average for Song Sparrow 73 minutes, for Chipping Sparrow, 66 minutes, for Robin 64 minutes. These times are identical with those given in the table, which covers the seasons of 1912 and 1913 only.

The Oven-bird's very early flight song, often followed by a second rendering somewhat later or sung by a second bird, or both, precedes by forty to fifty minutes, and sometimes even more, the regular song of the species, which averages to be given at 3.34, as many records show. Thus the Oven-bird in the time of its usual song ranks with the other warblers. But it so often sings its flight song once or twice at the much earlier hour that this song is now adopted to give the species its ranking.

As to the Barn Swallow, the farm barn having been removed, which had stood in the near neighborhood and was always occupied by a colony, no satisfactory records were obtained in the season of 1912. So the eleven records of this colony in previous seasons which were combined in the first paper are retained, supplemented by three records of 1913.

A pair of Tree Swallows nested in 1912 and again in 1913 in a box fastened to the front of the stable. The records are of the male bird in song flight between May 31 and June 17, 1913, inclusive. The records of 1912 obtained later in June and in early July on account of previous unfavorable weather, because less representative, have not been retained. There are three records of 2.56, 2.57, and 2.58, or 68, 66, and 64 minutes before sunrise; and one record is extraordinarily early, namely, 2.15 on June 19, a morning of remarkable clearness with full moon and the stars shining brilliantly. I was out at 2.15 and instantly heard the swallow in its song flight. I think it had just mounted into the sky and begun its song at 107 minutes before sunrise. As I have no other record within 42 minutes as early, I am inclined to regard this extremely

early awakening as due to the brilliancy of the sky and the amount of light present, suggesting to the bird that the "time to be up" had come. I have not combined this record with the others to form the average, regarding it as exceptional.

Mr. Allen gives an early record of 2.53; his next earliest is 3.07; Dr. C. W. Townsend is quoted with a 2.58 record. These records are in agreement with my series of six, which range from 2.56 to 3.07, or from 55 to 68 minutes before sunrise. The endurance of the bird in song flight is indeed remarkable, as Mr. Allen so well states. I have not timed its length, but my impression is that it continues unabated in vigor and ebullition of joy often more than an hour.

An Olive-sided Flycatcher located for a time at the border of the lower extent of woodland in the season of 1913 and furnished two records on June 11 and 13, which average 57 minutes before sunrise and 3.04, the earlier being at 2.51, when the bird sang once and in a half-minute again, coming into frequent repetitions of his song at 3.15 o'clock. Later in the month he was not heard and must have moved on to other ground for mating.

The Olive-backed Thrush's ranking has been advanced many minutes by records of 1912, within the woodland taken near to the songsters; four in the lower woodland average 56 minutes before sunrise; three in the upper woodland, 53 minutes. The slightly earlier singing in the lower woodland near the border of the big field among sparse growth of timber may be due to the light of dawn breaking through there a few minutes earlier than it does into the heart of the woods, where the shade is dense. The earliest record in the lower section of the wood is 63 minutes, while the earliest in the upper section is 57 minutes. In each location three and sometimes four birds awoke to sing in quick succession. Either one of the call-notes, or, it may be, all three of the calls are repeated only for a minute or two preliminary to the song. On the other hand the Hermit Thrush usually calls for five minutes and sometimes for ten minutes before singing. The records of both species are based on song. Those of 1913 are in close agreement with the previous season's.

The Kingbird has not furnished entirely satisfactory records as yet. With the exception of one, which is unusually early, when

the bird passed in song flight at 2.58 on a moonlit morning, six records of close similarity average 3.16 o'clock. The very early record has been included in drawing the average, and the result of the seven records is 3.13 o'clock. Mr. Allen's average for ten records is 3.10, and Dr. Townsend is quoted with a 3.08 record. My records, therefore, with the single exception named, are uniformly later, since five minutes require to be added to them in comparing them with Boston records. And in even-song the Kingbird has not been heard as late as the other flycatchers by many minutes.

In early July, 1912, the song of a Wood Thrush was heard daily in the woodland. At first the bird was located in the lower reaches of the wood and on July 2 and 4 averaged to sing 43 minutes before sunrise. Later it frequented the upper section of the wood and on July 6 and 9 the average time of first song was 34 minutes. Twice also the song entered the record taken on the lawn, namely, on July 7 and 10, when the average time was 34 minutes. The average time of the six records is 37 minutes and 3.32 o'clock. On one occasion the bird repeated its song a few times only during the first ten minutes and then sang freely for fifteen minutes. On another occasion two minutes after its first song it began to sing freely and continued singing for twenty minutes. The time given in the first paper for three June records is 36 minutes and 3.26 o'clock.

Of the ten records in 1912 of the Crow's first call, averaging 35 minutes before sunrise and 3.35 o'clock, three are very exceptional, since a call or two were heard much earlier than on the other seven occasions, namely, 69, 49, and 41 minutes before sunrise respectively. These few very early calls were not followed by others until the usual time for the Crow to be heard. Were these few exceptionally early calls disregarded, the average time of the ten records would be 28 minutes and 3.41 o'clock, and the variation in time would be but nine minutes for the ten occasions. The three exceptional records advance the average time of the Crow seven minutes. The time given in the first paper was 21 minutes and 3.44 o'clock, due to the inclusion of four unusually late records. Had these been eliminated, the remaining ten records would have averaged 24 minutes and 3.42 o'clock, the variation in time being

ORDER OF EVEN-SONG.

Relative order of latest song	Names of Species.	Number of records	Average number of minutes before or after sunset of latest song	Latest final song (minutes before or after sunset)	Earliest final song (minutes before or after sunset)	Average clock-time, p. m., of the records	Clock-time corresponding to latest sunset at 7.30
	<i>Before sunset</i>						
1	Northern Pileated Woodpecker (<i>Phloeotomus pileatus abieticola</i>)	1	59	59	59	6.31	6.31
2	Downy Woodpecker (<i>Dryobates pubescens medianus</i>)	2	31	23	39	6.54	6.59
3	Chickadee (<i>Penthestes atricapillus atricapillus</i>)	2	23	19	28	7.04	7.07
4	Myrtle Warbler (<i>Dendroica coronata</i>)	6	19	3†	33	7.06	7.11
5	Winter Wren (<i>Nannus hiemalis hiemalis</i>)	1	17	17	17	7.12	7.13
6	Red-eyed Vireo (<i>Vireosylva olivacea</i>)	10	14	4†	25	7.12	7.16
7	Cedar Waxwing (<i>Bombicilla cedrorum</i>)	*4	7	3	9	7.19	7.23
8	Red-breasted Nuthatch (<i>Sitta canadensis</i>)	*4	6	7†	13	7.22	7.24
9	Chestnut-sided Warbler (<i>Dendroica pensylvanica</i>)	3	5	1†	8	7.23	7.25
10	Purple Finch (<i>Carpodacus purpureus purpureus</i>)	14	4	9	20	7.23	7.26
11	Crow (<i>Corvus brachyrhynchos brachyrhynchos</i>)	*25	4	14†	30	7.23	7.26
12	Mourning Warbler (<i>Oporornis philadelphia</i>)	3	3	10	11	7.25	7.27
13	Golden-crowned Kinglet (<i>Regulus satrapa satrapa</i>)	3	3	8†	11	7.21	7.27
14	Goldfinch (<i>Astragalinus tristis tristis</i>)	18	2	12	13	7.26	7.28
15	Black-throated Green Warbler (<i>Dendroica virens</i>)	8	0	11†	8	7.26	7.30
	<i>After sunset</i>						
16	Chimney Swift (<i>Chatura pelagica</i>)	14	1	12	9	7.29	7.31
17	Bay-breasted Warbler (<i>Dendroica castanea</i>)	2	2	5	1**	7.28	7.32
18	Tree Swallow (<i>Iridoprocne bicolor</i>)	7	2	8	5	7.31	7.32
19	Yellow-bellied Sapsucker (<i>Sphyrapicus varius varius</i>)	*2	3	14	8	7.29	7.33
20	Bobolink (<i>Dolichonyx oryzivorus</i>)	5	3	14	5**	7.32	7.33
21	Black-throated Blue Warbler (<i>Dendroica cerulescens cerulescens</i>)	8	4	12	3**	7.29	7.34
22	Northern Parula Warbler (<i>Compothlypis americana usnea</i>)	3	5	10	2	7.33	7.35
23	Kingbird (<i>Tyrannus tyrannus</i>)	10	5	17	6**	7.31	7.35
24	Black and White Warbler (<i>Mniotilta varia</i>)	1	7	7	7	7.36	7.37
25	Redstart (<i>Setophaga ruticilla</i>)	13	7	17	1**	7.35	7.37
26	Indigo Bunting (<i>Passerina cyanea</i>)	17	9	20	1	7.37	7.39
27	Blackburnian Warbler (<i>Dendroica fusca</i>)	11	10	17	1	7.37	7.40
28	Blue-headed Vireo (<i>Lanius solitarius solitarius</i>)	6	19	19	19	7.37	7.40

25	Redstart (<i>Setophaga ruticilla</i>)	13	7	17	1**	7.35	7.37
26	Indigo Bunting (<i>Passerina cyanea</i>)	17	9	20	1	7.37	7.39
27	Blackburnian Warbler (<i>Dendroica fusca</i>)	11	10	17	1	7.37	7.40
28	Blue-headed Vireo (<i>Lanius solitarius solitarius</i>)	3	10	29	2**	7.34	7.40
29	Cliff Swallow (<i>Petrochelidon lunifrons lunifrons</i>)	*2	11	13	8	7.41	7.41
30	Canada Warbler (<i>Wilsonia canadensis</i>)	2	11	15	7	7.39	7.41
31	Slate-colored Junco (<i>Junco hyemalis hyemalis</i>)	5	12	19	5	7.41	7.42
32	Olive-sided Flycatcher (<i>Nuttallornis borealis</i>)	1	13	13	13	7.39	7.43
33	Oven-bird (<i>Seiurus aurocapillus</i>)	*2	13	35	2	7.40	7.43
34	Belted Kingfisher (<i>Ceryle alcyon alcyon</i>)	27	15	16	14	7.43	7.45
35	Nashville Warbler (<i>Vermivora rubricapilla rubricapilla</i>)	5	15	20	9	7.44	7.45
36	Bluebird (<i>Sialia sialis sialis</i>)	2	17	22	12	7.42	7.47
37	Magnolia Warbler (<i>Dendroica magnolia</i>)	21	17	24	10	7.45	7.47
38	Black-billed Cuckoo (<i>Coccyzus erythrophthalmus</i>)	4	17	34	1	7.46	7.47
39	Maryland Yellowthroat (<i>Geothlypis trichas trichas</i>)	3	22	23	19	7.49	7.52
40	Phoebe (<i>Sayornis phoebe</i>)	2	22	24	19	7.49	7.52
41	Song Sparrow (<i>Melospiza melodia melodia</i>)	22	23	39	14	7.51	7.53
42	Chipping Sparrow (<i>Spizella passerina passerina</i>)	25	24	31	17	7.52	7.54
43	Least Flycatcher (<i>Empidonax minimus</i>)	5	25	33	19	7.55	7.55
44	Vesper Sparrow (<i>Poocetes gramineus gramineus</i>)	14	26	34	16	7.55	7.56
45	Barn Swallow (<i>Hirundo erythrogastra</i>)	1	27	27	27	7.54	7.57
46	Savannah Sparrow (<i>Passerculus sandwichensis savanna</i>)	10	27	34	17	7.56	7.57
47	White-throated Sparrow (<i>Zonotrichia albicollis</i>)	11	27	43	17	7.55	7.57
48	Wood Thrush (<i>Hylocichla mustelina</i>)	3	27	34	16	7.55	7.57
49	Wood Pewee (<i>Myiochanes virens</i>)	25	30	39	19	7.57	8.00
50	Scarlet Tanager (<i>Piranga erythromelas</i>)	3	31	41	26	8.00	8.01
51	Hermit Thrush (<i>Hylocichla guttata pallasi</i>)	20	33	40	25	8.02	8.03
52	Robin (<i>Planesticus migratorius migratorius</i>)	25	33	45	30	8.01	8.03
53	Alder Flycatcher (<i>Empidonax traillii alnorum</i>)	4	34	39	26	8.01	8.04
54	Veery (<i>Hylocichla fuscescens fuscescens</i>)	19	35	40	29	8.03	8.05
55	Olive-backed Thrush (<i>Hylocichla ustulata swainsoni</i>)	32	37	49	29	8.05	8.07

* Call-note.

† After sunset.

** Before sunset.

twelve minutes. Twenty records would then give the average time of the Crow's first call as 26 minutes and 3.42 o'clock and would place the species seven lower in the list. We, however, have given it the benefit of the three exceptionally early records of 1912, which advance the time seven minutes. The records of 1913, nine in number, average 32 minutes and 3.31, there being again in this season three records very much earlier than the other six, namely, at 52, 45, and 39 minutes. These nine records combined with the ten of 1912 give an average time of 34 minutes and 3.33 o'clock. Mr. Allen's average of thirteen records is 3.33 o'clock. There is entire agreement, therefore, in the time of the Crow's first calls, barring the difference in time between Boston and Jefferson, but as twenty-nine species in this mountain hamlet precede it in awakening song, ranging from 48 to 3 minutes earlier, I venture still to call the Crow "a comparatively late riser."

The House Sparrow's record was obtained on the four occasions in the season of 1913 on which I procured the records of the Cliff Swallow, a half mile distant. Happily the species is no nearer our home than this! Four records of awakening with first calls were 3.38, 3.40, 3.43, and 3.45, differing but three minutes in respect to sunrise.

Cliff Swallows in a large colony of seventy-five to a hundred pairs occupy the eaves of a large farm barn half a mile away. On four mornings of 1913, June 19, 23, 30, and July 7, position was taken in front of this barn at 2.33, 2.24, 2.23, and 2.42 respectively. The first three mornings the sky was clear. The fourth morning was cloudy, and a change to low temperature had occurred during the night. The eaves were carefully watched on these occasions and no swallow came from them or voice of swallow was heard until 3.41, 3.47, 3.45, and 3.57 respectively, the delay upon the clouded morning being seven minutes later than the average time of the other three in respect to sunrise. The Cliff Swallow, therefore, differs widely from the Tree Swallow and the Barn Swallow in its time of awakening, being forty-four minutes later than they, and waiting until it is fully light or within seventeen minutes of sunrise. May this trait not be a relic of its earlier habit of nesting in holes in cliffs? Even now the retort-like entrances to their nests seclude the birds as it were within a hole. And all the hole-nesting birds,

as far as my observations have gone, are late risers, namely, the kingfisher, the swift, the woodpeckers, and the nuthatches. Perhaps the Bluebird also is later than the other thrushes because of its hole-nesting habit. My few records show it to awake 18 minutes later than the Robin and from 6 to 8 minutes later than Veery, Hermit and Olive-backed Thrushes.

There are eight records of the Goldfinch in 1912 obtained in July, averaging 4 minutes before sunrise and 4.11 o'clock, the variation in time of which, excepting one record, is but three minutes. The average of the seven records is three minutes before sunrise. On July 7 a bird began to call in a near tree by the roadside at four minutes before sunrise. I had not perceived it come on the wing, and the inference was that it had spent the night in this tree. There was a nesting in the middle of July in the orchard. On July 10, 13, and 17 the male bird's song in the air was recorded at one, one, and two minutes before sunrise respectively. On July 28, the date of earliest awakening, the call was first given thirteen minutes before sunrise, and one minute later the male bird was on the wing in jubilant song, while the female bird continued her calls in the orchard. This earliest of song records has been included notwithstanding the lateness of the date, because the song season of the Goldfinch was still at its height. It also indicates that the birds, contrary to the usual course, awoke on this date as early as they had done ten days earlier, although sunrising was ten minutes later, which accounts for the record being as early as thirteen minutes before sunrise. So the Goldfinch quietly awaits the full light of day before becoming responsive in movement and song. Six records of 1913 average seven minutes before sunrise, and the entire fourteen records, five minutes.

Belted Kingfisher nested in a gravelly bank at the roadside a quarter of a mile away in 1913. Three records were obtained on June 15, 21, and 25. On the earliest date position was taken at 2.28. The male bird came to the bank with rattle call at 3.53, but flew away without perching; at 4.02 he came again and perched on a fence post just above the nest; at 4.05 he left again. On the second occasion at 4.04 one of the pair flew from the bank calling in flight, presumably the female. At 4.10, 4.14, 4.18 and 4.21 one of the birds successively approached without coming to the bank,

being suspicious evidently on account of my presence near the nest. At 4.24 the female, presumably, returned into the hole. On the third occasion I was in position at 2.30. At 4.16 the first rattle was heard of one of the birds approaching, and a minute later perch was taken on the fence post above the nest. These records, while not wholly conclusive, indicate that the Kingfisher is a late riser like other hole-nesting birds.

The record of Chimney Swift has been transferred from the first paper, no birds having occupied near chimneys in the season of 1912. And in this season so few records of Chickadee and Bobolink were obtained, I have combined with these, supplemented by records of 1913, the records of the several previous seasons in drawing the averages of these species.

Voicings of the nuthatches have not been heard on any occasion until well toward the close of the record or until after the songs of the flycatchers, the warblers, and the thrushes had all been heard, although I have often been within range of their voices. A pair of White-breasted and two pairs of Red-breasted have been resident within the wood. The voices of the latter have followed closely after the song of the latest awakening warbler, the Bay-breast. The voice of the former has been many times heard when later rambles through the woodland have been taken, but has been recorded but once during morning awakening. The nuthatches, therefore, like the woodpeckers, appear to first voice themselves among the latest awakening species, when they are not the last of all.

The voice of the Pileated Woodpecker has been frequently heard when I have taken my customary walks in the wood in the early morning. That it has reached me but once while recording morning awakening is accepted as evidence that the species seldom voices itself until after sunrise. The time given in the first paper based on eight records, mostly obtained in June, was 11 minutes after sunrise. There are two before sunrise records of 16 and 9 minutes in 1905 and 1902. I cannot say that the Downy Woodpecker does not sometimes voice itself before sunrise in call, or song, or rappings, but the experience of many morning awakenings is that it does not.

Other species which entered into the records of 1912 and 1913,

but came within hearing in a casual way only, were: Broad-winged Hawk (*Buteo platypterus*), 4.05; Barred Owl (*Strix varia varia*) hooting at 2.18, 2.38, 2.39 and 3.01 on four several occasions; Great Horned Owl (*Bubo virginianus virginianus*) calling at 2.27 and 2.37 on two occasions; Nighthawk (*Chordeiles virginianus virginianus*) at 2.24, 2.57 and 2.58 on three occasions; Ruby-throated Hummingbird (*Archilochus colubris*), 3.55 and 4.33; Crested Flycatcher (*Myiarchus crinitus*), 5.30; Pine Siskin (*Spinus pinus*), 5.04; Rose-breasted Grosbeak (*Zamelodia ludoviciana*), 3.56; Water-thrush (*Seiurus noveboracensis noveboracensis*), 5.02; Brown Creeper (*Certhia familiaris americana*), 4.13 o'clock.

Were the species ranked in accordance with the single earliest song of each, the order would be somewhat changed but in no very essential particular, as may be seen by the table which follows. Occasionally a species would rank several higher or several lower, but these variations would not destroy the general trend as to families and their relative places in the awakening.

In drawing up the averages presented in this paper the records of seasons previous to 1912 and 1913 have not been retained, except where their use has been already mentioned. The desire was to start anew with the experience previously gained and outline as true an order as circumstances would allow. That it is not perfect and may be amended by future experience of himself and others the author is well aware and is content in the thought.

It should be borne in mind that five minutes should be added to the clock time records to obtain the corresponding time at Boston, as sunrise is five minutes earlier in Jefferson.

Attention was also given to even-song in the season of 1912. Ten records were obtained on the lawn, three in the heart of the woodland, and one at the lower border of the woods. They were taken between June 23 and July 24 inclusive, a period during which the variation in time of sunset is thirteen minutes, namely, from the time of latest sunset, which is 7.30 at Jefferson, to its setting at 7.17 o'clock. The method pursued is opposite to that followed in morning awakening, when each species is enrolled by its first song or call. In even-song each is enrolled by the time it ceased to sing or give a call-note. So it is necessary from the beginning to record each minute the birds which are singing. When one ceases,

ORDER OF AWAKENING.

Relative order of awakening	Names of Species.	Number of records	Average number of minutes before sunrise of first song	Earliest initial song (minutes before sunrise)	Latest initial song (minutes before sunrise)	Average clock-time, A. M., of the records	Clock-time corresponding to earliest sunrise at 4.02
1	Wood Pewee (<i>Myiochanes virens</i>)	6	82	93	75	2.46	2.40
2	Alder Flycatcher (<i>Empidonax traillii alnorum</i>)	10	77	89	63	2.49	2.45
3	Song Sparrow (<i>Melospiza melodia melodia</i>)	22	73	90	55	2.52	2.49
4	Oven-bird (<i>Seiurus aurocapillus</i>)	16	70	91	54	2.55	2.52
5	Chipping Sparrow (<i>Spizella passerina passerina</i>)	16	66	87	48	2.58	2.56
6	White-throated Sparrow (<i>Zonotrichia albicollis</i>)	6	65	87	50	2.59	2.57
7	Robin (<i>Planesticus migratorius migratorius</i>)	16	64	81	56	3.00	2.58
8	Barn Swallow (<i>Hirundo erythrogastra</i>)	14	61	82	45	3.02	3.01
9	Tree Swallow (<i>Iridoprocne bicolor</i>)	6	61	68	55	3.01	3.01
10	Vesper Sparrow (<i>Poocetes gramineus gramineus</i>)	16	60	76	48	3.05	3.02
11	Savannah Sparrow (<i>Passerculus sandwichensis savanna</i>)	16	59	75	46	3.06	3.03
12	Black-billed Cuckoo (<i>Coccyzus erythrophthalmus</i>)	3	57	72	30	3.07	3.05
13	Olive-sided Flycatcher (<i>Nuttallornis borealis</i>)	2	57	71	44	3.04	3.08
14	Olive-backed Thrush (<i>Hylocichla ustulata swainsoni</i>)	13	54	63	47	3.13	3.08
15	Phoebe (<i>Sayornis phoebe</i>)	16	53	68	45	3.10	3.09
16	Hermite Thrush (<i>Hylocichla guttata pallasi</i>)	18	53	63	45	3.13	3.09
17	Indigo Bunting (<i>Passerina cyanea</i>)	14	52	63	42	3.14	3.10
18	Veery (<i>Hylocichla fuscescens fuscescens</i>)	16	52	59	42	3.15	3.10
19	Kingbird (<i>Tyrannus tyrannus</i>)	7	51	64	40	3.13	3.11
20	Scarlet Tanager (<i>Piranga erythromelas</i>)	4	51	57	42	3.21	3.11
21	Least Flycatcher (<i>Empidonax minimus</i>)	2	51	54	47	3.13	3.11
22	Slate-colored Junco (<i>Junco hyemalis hyemalis</i>)	15	46	60	40	3.20	3.16
23	Maryland Yellow-throat (<i>Geothlypis trichas trichas</i>)	6	46	54	43	3.20	3.16x
24	Bluebird (<i>Sialia sialis sialis</i>)	6	46	51	36	3.19	3.16
25	Chestnut-sided Warbler (<i>Dendroica pensylvanica</i>)	7	38	41	36	3.27	3.24
26	Wood Thrush (<i>Hylocichla mustelina</i>)	6	37	50	26	3.32	3.25
27	Magnolia Warbler (<i>Dendroica magnolia</i>)	9	37	43	32	3.28	3.25
28	Mourning Warbler (<i>Oporornis philadelphia</i>)	5	37	42	22	3.32	3.25
29	Black-throated Blue Warbler (<i>Dendroica cerulea cerulea</i>)	9	37	41	28	3.32	3.25
30	Crow (<i>Corvus brachyrhynchos brachyrhynchos</i>)	*19	34	64	17	3.33	3.28
31	Purple Finch (<i>Carpodacus purpureus purpureus</i>)	6	33	45	21	3.29	3.29
32	Blackburnian Warbler (<i>Dendroica fusca</i>)	14	33	41	27	3.29	3.26

27	Magnolia Warbler (<i>Dendroica magnolia</i>)	9	37	43	32	3.25
28	Mourning Warbler (<i>Oporornis philadelphia</i>)	5	37	42	22	3.25
29	Black-throated Blue Warbler (<i>Dendroica caerulescens caerulescens</i>)	9	37	41	28	3.25
30	Crow (<i>Corvus brachyrhynchos brachyrhynchos</i>)	*19	34	64	17	3.28
31	Purple Finch (<i>Carpodacus purpureus purpureus</i>)	6	33	45	21	3.29
32	Blackburnian Warbler (<i>Dendroica fusca</i>)	14	33	41	27	3.29
33	Canada Warbler (<i>Wilsonia canadensis</i>)	7	32	42	27	3.30
34	Red-eyed Vireo (<i>Vireosylva olivacea</i>)	22	31	42	23	3.31
35	Redstart (<i>Setophaga ruticilla</i>)	9	30	40	24	3.32
36	Northern Parula Warbler (<i>Compsothlypis americana usneae</i>)	11	29	35	23	3.33
37	Blue-headed Vireo (<i>Lanius solitarius solitarius</i>)	8	28	48	13	3.34
38	Black-throated Green Warbler (<i>Dendroica virens</i>)	7	28	33	25	3.34
39	Black and White Warbler (<i>Mniotilta varia</i>)	4	27	35	22	3.35
40	Golden-crowned Kinglet (<i>Regulus satrapa satrapa</i>)	9	27	34	22	3.35
41	Nashville Warbler (<i>Vermivora rubricapilla rubricapilla</i>)	3	27	33	22	3.38
42	Winter Wren (<i>Tannus hiemalis hiemalis</i>)	3	25	31	21	3.37
43	Myrtle Warbler (<i>Dendroica coronata</i>)	2	24	49	2†	3.38
44	House Sparrow (<i>Passer domesticus domesticus</i>)	*4	23	25	22	3.39
45	Chickadee (<i>Parus atricapillus atricapillus</i>)	12	22	33	13	3.40
46	Bay-breasted Warbler (<i>Dendroica castanea</i>)	6	21	32	16	3.41
47	Red-breasted Nuthatch (<i>Sitta canadensis</i>)	*4	17	27	8	3.45
48	Cliff Swallow (<i>Petrochelidon lunifrons lunifrons</i>)	*4	17	21	12	3.47
49	Yellow-bellied Sapsucker (<i>Sphyrapicus varius varius</i>)	*9	7	15	1†	3.55
50	Goldfinch (<i>Astragalinus tristis tristis</i>)	14	5	14	0	3.57
51	Cedar Waxwing (<i>Bombicilla cedrorum</i>)	*4	1†	6	3†	4.03
52	Belted Kingfisher (<i>Ceryle alcyon alcyon</i>)	*3	2†	9	12†	4.04
53	Bobolink (<i>Dolichonyx oryzivorus</i>)	14	3†	28	19†	4.05
54	Chimney Swift (<i>Chatura pelagica</i>)	10	5†	6	19†	4.07
55	White-breasted Nuthatch (<i>Sitta carolinensis carolinensis</i>)	*1	10†	10†	10†	4.12
56	Northern Pileated Woodpecker (<i>Phlaeotomus pileatus abieticola</i>)	9	11†	16	13†	4.13
57	Downy Woodpecker (<i>Dryobates pubescens medianus</i>)	4	19†	3†	27†	4.21

* Call-note. † After sunrise.

the time of its last song is thus known. And when the record of the evening has been completed, the species are ranked in their true order. The earlier records of the season were begun about 6.30, or an hour before sunset; the later about 6.45, or from thirty to forty minutes before sunset. A few species always dropped out almost at once. Other species continued their songs for some time, either singing constantly or after intervals of rest resuming their songs. Still others sang from the beginning to the close. All the species which entered into the morning awakening records are included in even-song, except House Sparrow and White-breasted Nuthatch, a full quota of voices having been heard by visiting the several locations. In the season of 1913 thirty evening records were taken, covering a wider range of location, between June 2 and July 8 inclusive. These have been combined with the records of 1912 in drawing up the averages presented in the table of even song. Records previous to these two seasons have been only exceptionally retained.

As stated in the first paper, all these records show that even-song does not extend as long after sunset as matins precede sunrise. For while the earliest nine singers in morning awakening precede sunrise by an hour to an hour and twenty minutes, the latest nine singers in even song cease singing from twenty-seven to thirty-seven minutes after sunset, a shortening of thirty-five to forty minutes. And it also continues to hold true by the records of 1912 and 1913 that the order of the awakening, generally speaking, is reversed in the evening. So the flycatchers, the sparrows, and the thrushes are the latest singers, just as they are the earliest in the morning. The thrushes, however, are invariably the last of all, Wood Pewee, Alder Flycatcher, and Scarlet Tanager only ranking with them. Five of the thrushes, Wood, Hermit, Robin, Veery, and Olive-backed, continue to sing from twenty-seven to thirty-seven minutes after sunset. The Bluebird's record does not extend as late by ten minutes. Black-billed Cuckoo's, Belted Kingfisher's, and Olive-sided Flycatcher's calls cease about the time of the Bluebird's song. The Barn Swallow's record is twenty-seven minutes after sunset. Five common sparrows, Savannah, White-throated, Vesper, Chipping, and Song, and the two flycatchers, the Least and Phoebe, cease singing just earlier, or from twenty-

seven to twenty-two minutes after sunset. Indigo Bunting and Junco records and those of the Kingbird do not extend as late. All the warblers end their songs before the sparrows and these flycatchers during the preceding twenty-seven minutes or from twenty-two minutes after sunset to five minutes before, Myrtle Warbler, however, ceasing earlier. Blue-headed Vireo ranks among the later singing warblers, while Golden-crowned Kinglet and Red-breasted Nuthatch rank with the earlier-ceasing warblers. Chimney Swift, Tree Swallow, and Bobolink become silent immediately after the going down, of the sun. Cliff Swallows keep in the air some minutes later. The Crow gives its last calls a few minutes before and seldom are any heard after sunset. At the same time, just before sunset, Purple Finch and Goldfinch end their songs, and Cedar Waxwings cease to call. Red-eyed Vireo ceases to sing fourteen minutes before sunset; Winter Wren and Chickadee still earlier. The voices of the woodpeckers are lost first of all soon after the recording has begun, or from half an hour to an hour before sunset, as in the morning their first calls are seldom heard until after sunrise; the Sapsucker, however, detaches itself somewhat from the group by being less late in the morning and later in the evening than the others.

Averages have been drawn in the same manner as for morning awakening, and the number of minutes before or after sunset of the last song of each has been adopted as the basis of ranking the species, as was done in matins. The average clock-time of the records, as appealing more naturally to the mind, is also named. But this is not exact, if it be unrelated to the time of sunset. The probable time of last song of any species for any date, however, may be easily reckoned, when the time of sunset on that day is known. For while there is not an exact gradation in a series of records of any species following the gradation of earlier sunset, there is a close approximation to this. So, as the sun comes to set earlier evening by evening, the record closes proportionately earlier. But, as has been already stated, it has been found when a species is nearing the end of the season of its singing that the weakening spirit of song tends to bring the birds less promptly into song in the morning and to lead them to cease singing somewhat earlier in the evening. Thus late July records usually indicate this waning

spirit and a still earlier close of even-song, except, it may be, in the case of a few species like Wood Pewee, Red-eyed Vireo, Indigo, Bunting, and Hermit Thrush, which continuing their singing well into August are vigorous singers throughout July.

The Oven-bird in even-song not infrequently makes the flight song its last utterance. When this is not its last song, it often has been given several times during the final hour of singing. On July 7, 1912, three flight songs were given at about ten minute intervals, 7.18, 7.27, and 7.37 o'clock. In 1913 on nine evenings out of seventeen a flight song was the final song and was given at 7.32, 7.35, 7.35, 7.38, 7.43, 7.44, 7.44, 7.56, and 8.01, the variation in minutes after sunset being from 9 to 16, except on the two occasions of latest song, when the rendering of the flight song was 31 and 35 minutes after sunset, corresponding in some degree to the quite usual very early song in morning awakening.

Song Sparrow and Chipping Sparrow at the close of the day also give infrequent repetitions of their songs as their earliest songs in morning awakening are infrequently given. In the case of Song Sparrow in the evening of July 24, 1912, there were but eight repetitions of the song in the last twenty-five minutes of the bird's singing. Chippies sing no hurried trills in the evening as they regularly do in the morning awakening.

Three records of the Wood Thrush in 1912 average 27 minutes after sunset and 7.55 o'clock; the latest is 34 minutes on July 5. On this occasion, as I entered the woods at 6.43, the thrush was singing, and he sang much of the time up to his last song a half-minute after 8.02, then gave a few calls which ceased at 8.03 o'clock.

Twenty records of Hermit Thrush average 33 minutes after sunset and 8.02 for calls as well as the song; the latest are 40 minutes on two occasions when the calls extended to 8.09 and 8.10, the song having ceased at 8.07 and 8.05, respectively. On one other evening the song also extended to 8.05 o'clock.

Twenty-five records of the Robin average 33 minutes after sunset and 8.01 for calls as well as song. Calls are usually given for several minutes after the birds have ceased to sing. Sometimes the song ends much earlier. The latest record is 45 minutes and 8.15 for last calls, when the song ceased but one minute earlier. The variation in time of last note is fifteen minutes, but if the latest

record of 1913 be excepted, it is but eleven minutes in the sixteen evenings. The difference in the amount of the Robin's even-song is very wide. On one occasion there was no song the entire time of the record which began at 6.30, and only infrequently was a call heard. During the time of even song on several occasions Robins have sung but little, voicing themselves intermittently only, which is very unlike their jubilant and continuous singing for forty or forty-five minutes in the morning awakening. On the other hand occasionally one of the Robins of the neighborhood becomes a very free singer in the evening.

Nineteen records of Veery average 35 minutes after sunset and 8.03 for calls as well as song. The latest record for the song is 40 minutes at 8.08 on July 8, 1913; there is a similar record for the call on June 10 at 8.05, 40 minutes. The variation in time of last song is fifteen minutes, but on fourteen of the evenings is but three minutes, constituting the Veery one of the most regular of all the species in retiring to rest.

Thirty-two records of Olive-backed Thrush average 37 minutes after sunset and 8.05 for the song; for calls one minute later. The latest is 49 minutes at 8.10 on June 4, 1913, for the song. Four other records for the song are just earlier, at 41 and 42 minutes. The variation in time of last song on twenty-seven occasions is but seven minutes, constituting the Olive-backed Thrush as well as the Veery one of the most regular of all the species in its final song before rest.

These species were only casually recorded: Sharp-shinned Hawk (*Accipiter velox*) pursued by a pair of Tree Swallows, 7.21; Barred Owl (*Strix varia varia*), 7.40; Northern Flicker (*Colaptes auratus luteus*), 7.18; Whip-poor-will (*Antrostomus vociferus vociferus*) singing from 7.28 to 7.43; Nighthawk (*Chordeiles virginianus virginianus*), 7.32 to 7.34; Ruby-throated Hummingbird (*Archilochus colubris*), 7.20 to 7.42 o'clock. The Hummingbirds visited an apple-tree in blossom in the evening of May 31, 1913. One of the pair was seen hovering over the flowers at 7.20; the second appeared five minutes later, and the two together were busily engaged sipping and humming for four or five minutes, when one flew away and the other remained until 7.42, or 24 minutes after sunset, at which time the light had become rather dim.

Of the fifteen occasions of even-song in the season of 1912 Olive-backed Thrush was the latest singer on eleven, Veery on two, and Hermit on two. Holding position next to the last singer was Wood Pewee on seven occasions, Veery on five, Olive-backed Thrush on two, and Wood Thrush on one. Of twenty-three occasions of 1913 Olive-backed Thrush was the last singer on thirteen, Robin on five, Veery on three, and Hermit Thrush on two. Holding place next to the last singer was Veery on seven occasions, Olive-backed Thrush on six, Robin on five, and Hermit Thrush on five. With the western sky clear and the sunset glow remaining late, even-song has extended once to 8.15 o'clock and 45 minutes after sunset, an unusually late Robin singing a few times at 8.14 and giving final calls one minute later.

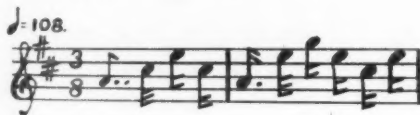
The last song of all as recorded on ten occasions in 1912 was given with a variation in time of only three minutes, namely, from thirty-seven to forty minutes after sunset, or between 8.07 and 8.10 o'clock. Twenty-three records of 1913 average 40 minutes after the latest sunsetting or 8.10 for the last note. This indicates how regular in relation to the setting of the sun is the close of even-song, and how unfailingly one of four species of thrushes ends the singing, either the Olive-back, the Veery, the Robin, or the Hermit, with twenty-four chances in thirty-eight that the Olive-back's voice will be the last. One waits in the silence for a time and then withdraws. The birds' night has closed around them.

A REMARKABLE HERMIT THRUSH SONG.

BY HENRY OLDYS.

WHILE filling a lecture engagement at Hanover, N. H., early in May, 1913, I was the guest of Dr. Frederic P. Lord, of Dartmouth College. On the morning of the 6th my host and I visited a point near Pompanoosuc, Vt., where a pair of Pileated Woodpeckers nest annually. We were only partly successful in our quest — we heard one of the birds we were seeking, but failed to catch even a momentary glimpse of either of the pair. This disappointment, however, was far more than compensated for by the fact that as we sat in the mossy woods waiting for the woodpeckers I heard one of the most remarkable bird songs that has come to my ears during my twenty years' study of bird music. The singer, a Hermit Thrush, was in plain sight not more than forty or fifty feet away and gave ample opportunity for careful noting of the song.

The ordinary song of the Hermit Thrush is made up of different phrases each consisting of a sustained basal note followed by a run of higher, more rapid, and lighter notes composing a broken chord whose fundamental tone is the preceding sustained note. The second part of the phrase, — the running notes — suggests the thought that a material chord of glass has been shattered into fine bits and that the crystalline fragments come tinkling down through the leaves. Sometimes other notes than those of the chord are introduced in the run but without destroying the character of the sustained note as the fundamental tone. Illustrations will make this description clearer —



In this song the chord is —



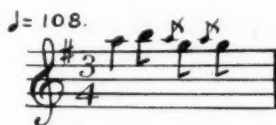
This example is from a record I secured at Hebron, Me., in 1905. Another, taken from a Hermit Thrush in the New York Zoölogical Park —



shows the introduction of a passing note, F, without destroying the idea of the chord —

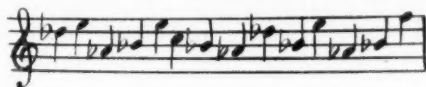


Interspersed with these phrases are very high, light, short phrases that punctuate the others somewhat after the style of the refrain so common in old songs and poems. Thus, the Hebron thrush sang, after the phrase quoted —



which might be interpreted as taking the place of *Fa-la-la-la*.

It must be further explained that the basal notes of the songs are usually more or less unrelated to each other — at least such has been the case in the comparatively few Hermit Thrush songs I have heard. Thus, the consecutive basal notes in a record I had made at Hebron a few days before my visit to Pompanoosuc were —



and so on. It will be noticed that there is no indication here of any normal order of utterance of these notes and the phrases based on them, and that the harmonic progressions of the different chords involved are not such as we commonly find in our own music. This is not to say that the music of this thrush was not attractive — there was a wild beauty in it that was delightful to the ear, — but merely that it shows no close relationship in its modulations to our own music.

In respect to having a normal order and departing from it freely this song resembles several rhythmical songs of Wood Thrushes I have secured, in which the normality of a certain order was very

evident, though variations were frequent. In every case the singer seems to maintain the normal order more steadily after it has gotten into the swing of its singing, so to speak, and when it is not disturbed in the slightest degree — a very little disturbance, such as the distant barking of a dog, is sufficient to disarrange the sequence.

The remarkable character of the song of the Pompanoosuc Hermit Thrush is sufficiently evident to anyone who has any but the duller ear for music. But I wish to call special attention to the additional proof it offers of the relationship between bird and human music. The chance that the bird happened upon this human progression of harmonies by coincidence is no less remote than that a wild bird — say a Purple Grackle — should utter with perfect pronunciation and inflection the words "My appetite is excellent this morning" through an accidental grouping of articulate sounds. In the case of the grackle we should without hesitation discard the theory of accidental coincidence and assert that the bird expressed itself in human speech. So, too, in the case of the Hermit Thrush must we discard the untenable theory of coincidence and declare that the bird expresses itself in human music.

The notes recorded were sung with great accuracy of intonation — my ear is very keen to detect variations from the true pitch. They were truer to the scale than those of nine human singers out of every ten, and were recorded exactly as given. The song is doubtless exceptional — though I judge that fuller study of the singing of Hermit Thrushes than it has yet received would disclose other songs showing similar harmonic correspondence with our own musical requirements, — but *any* such resemblance to our musical forms as it displays, though but a single instance, would serve to establish relationship between bird and human music, while the large number of recorded instances so far as other species are concerned, makes the principle absolutely impregnable. A little thought will show that coincidence is as much out of the question as in the case of the hypothetical blackbird above mentioned, and that imitation, as an explanation, has as little standing. Astonishing and revolutionary as it may seem, there is no escape from the conclusion that the evolution of bird music independently parallels the evolution of human music and that, therefore, such evolution in each case is not fortuitous, but tends inevitably toward a fixed ideal.

SOME SEASONAL NOTES ON LONG ISLAND BIRDS.

BY HENRY THURSTON AND HOWARTH S. BOYLE.¹

On the 22d of October, 1907, the Linnaean Society of New York published an abstract containing "A List of Long Island Birds," by Dr. Wm. C. Braislin. Though this list, for which every Long Island bird student feels indebted to Dr. Braislin, is the most complete and best list of Long Island birds that has yet appeared, we have made several observations that more or less extend the seasonal occurrence of certain species as there given and offer them herewith together with certain other notes that may prove of interest to investigators of avian life in this vicinity.

Our notes that extend dates recorded by Dr. Braislin are marked by an asterisk.

***Pisobia fuscicollis*.** WHITE-RUMPED SANDPIPER.—I had a fine chance to see an individual at Mastic, L. I., on August 24, 1912. Mr. J. T. Nichols and I observed another on August 26. (T)

***Numenius hudsonicus*.** HUDSONIAN CURLEW.—Unusually abundant this (1912) season. A flock of fifty by actual count, were seen at Freeport, L. I., on August 4, 1912.

The largest flocks were seen earlier. In company with my brother on July 27, 1912, I saw three large flocks, one composed of one hundred and fifty birds. (T)

***Zenaidura macroura carolinensis*.** MOURNING DOVE.—On the sixteenth of March, 1913, on the Flushing Meadows, Flushing, L. I., I observed one of these birds which I studied for ten minutes or more. Upon clapping my hands the bird flew, disappearing in the mist. (B)

****Circus hudsonius*.** MARSH HAWK.—This bird is a winter resident at Flushing. I have records as follows all from Flushing Meadows: February 24, November 3, November 24, 1912, and January 1, 1913. (B)

***Falco sparverius sparverius*.** SPARROW HAWK.—This little falcon is a winter resident; my note book shows records as follows: December 30, 1911, January 10, November 24, December 7, 8, and 29, 1912. These observations were also made at Flushing Meadows and near vicinity. (B)

****Asio wilsonianus*.** LONG-EARED OWL.—While walking over a frozen birch swamp two miles back of Flushing, L. I., on February 8, 1913, I unexpectedly stumbled upon a roosting place of the Long-eared Owls. As we

¹ Observations made by Mr. Boyle are followed by a B; those by Mr. Thurston have a T appended.

approached the tree in which they were roosting, the birds flew. We remained quietly seated on the roof of a musk-rat house, which was situated beneath the tree and I heard one of the owls give a warble-like note. Presently they began to return. I counted twelve and my companion saw fifteen. We made our exit from under their roost without further disturbing them. The Owls were also seen on February 9 and 15, 1913. (B)

Cryptoglaux acadica acadica. SAW-WHET OWL.—I got my first record for the Saw-whet Owl at Floral Park, L. I., on November 24, 1912. A boy brought in a beautiful immature specimen which he had found dead in the woods. (T)

***Ceryle alcyon alcyon.** BELTED KINGFISHER.—At North Beach, a sandy strip near Flushing, L. I., on the twenty-sixth of February, 1911, I saw a Kingfisher. (B)

***Archilochus colubris.** RUBY-THROATED HUMMINGBIRD.—While sailing out of New York Harbor on the tenth of May, 1912, a Ruby-throated Hummingbird flew aboard the boat while off the lower Staten Island shore and hovered a few minutes around the awnings, finally flying toward the Long Island shore. It was a male bird and undoubtedly made Long Island as I had a strong pair of glasses and was able to follow its flight, which was direct for that shore. (T)

Tyrannus tyrannus. KINGBIRD.—At Mastic, L. I., on August 24, 1912, while walking with Mr. John Treadwell Nichols near his home we observed straggling flocks of migrating Kingbirds that numbered about three hundred individuals. The birds seemed to be following a fixed route as every one would first approach us by flying along the banks of a small stream near which we were standing and upon reaching a point a little above our station branched off and took an inland course.

Kingbirds seemed unusually common on Long Island during the fall season of 1912. (T)

***Corvus ossifragus.** FISH CROW.—A common resident this winter, if not every one. Early in the frosty mornings from my window I can see them journeying with their common black cousins to a garbage dump that lies east of Floral Park. On December 25, 1912, I collected one from a mixed flock of about three hundred birds that descended on our grounds. About seventy-five of this flock were *C. ossifragus*. More were also seen on February 28, 1913, at the same dump. (T)

Sturnus vulgaris. EUROPEAN STARLING.—On the 19th of February at Floral Park, L. I., I saw a flock of Starlings, conservatively estimated to contain five thousand birds.

A habit of Starlings which might be of interest to those who have not witnessed it is that of indulging in mid-night serenades. Several times in the evening, once or twice rather late, I have passed at Hempstead, L. I., a couple of churches with old-fashioned towers that make fine roosting places for numbers of these birds and have always heard them squeaking, hissing or whistling. On March 4, 1913, one was sounding his rich melodious call at the top of his voice, at 10.30 P. M. (T)

Dolichonyx oryzivorus. BOBOLINK.—My first Long Island Bobolinks were seen, in company with Mr. Nichols at Mastic on August 24, 1912. We arose about 4. A. M. and started for a sniping trip in his canoe and it did not take us long to realize that a large migratory flight was on. The air was full of bird calls, shadowy forms of Nighthawks and Whippoorwills dashed by, but chiefly noticeably above all other sounds was the sparkling, silvery "link, link, link" of hundreds of Rice Birds. As dawn approached we could begin to see the flocks pass and most of them were very high. We calculated that eight thousand birds passed over us. The flight was over by 8.30 A. M. (T)

***Zonotrichia leucophrys leucophrys.** WHITE-CROWNED SPARROW.—In a large berry patch at Floral Park, L. I., on October 22, 1912, I saw some strange looking sparrows and immediately collected one which proved to be a juvenal White-crowned Sparrow. There were about thirty birds in this flock and they stayed with us quite late; so late in fact that I collected another, now in Dr. Dwight's collection, on the fifth of November!

Dr. Braislin's latest record for Long Island seems to be October 21 and he also quotes this bird as "rare." I wonder if this is not due to the fact that the immature plumage is not half so well known as that of the adult.

The numbers seen this fall would make the species anything but rare, though of course there may have been an unusually large flight this season. (T)

***Spizella monticola monticola.** TREE SPARROW.—I have the following late records for the Tree Sparrow on Flushing Meadows: April 13, 14, 20, and 21, 1912. Newtown Swamp, April 7, 1912. (B)

***Spizella pusilla pusilla.** FIELD SPARROW.—Several were seen at Floral Park, L. I., on February 15, 1913. This extends either the early date of arrival or, what is more probable, establishes the bird as a winter resident on Long Island. I fail to see why this should not be the case as they reside in New Jersey all winter at practically the same latitude. (T)

***Melospiza georgiana.** SWAMP SPARROW.—On the salt marshes at Flushing, L. I., the Swamp Sparrow may be found on almost any day during the winter. The short bushes that cover the higher places form excellent shelters for the birds. Dates as follows: December 7, 8, 29, 1912, and February 15, 1913. (B)

***Passerella iliaca iliaca.** FOX SPARROW.—During the winters of 1911 and 1912 the Fox Sparrow was often seen. Some records from Flushing Meadows: Feb. 22 and 26, December 3, 1911, January 20, December 7 and 8, 1912. These sparrows were also seen at Jamaica, L. I., on January 20, 1912. (B)

***Lanius ludovicianus migrans.** MIGRANT SHRIKE.—Unusually common around Floral Park during the fall migration of 1912. I collected three individuals and several others were seen. The dates of collection were September 13, October 1, and October 22, 1912. (T)

***Vermivora chrysoptera.** GOLDEN-WINGED WARBLER.—One observed at Flushing, L. I., on May 12, 1912. It was watched for nearly a half an hour. (B)

**Dumetella carolinensis*. CATBIRD.— On November 2 and 10, 1912, a Catbird, apparently in fine condition, was seen at Flushing, L. I. (B)

**Regulus satrapa satrapa*. RUBY-CROWNED KINGLET.— On September 30, 1911, a large flight of these Kinglets was observed in a patch of woods near Forest Hills, L. I. (B)

NOTES ON THE OCCURRENCE AND NESTING OF CERTAIN BIRDS IN RHODE ISLAND.

HARRY S. HATHAWAY.

DURING the interval which has elapsed since the publication of the 'Birds of Rhode Island' by Howe and Sturtevant in 1899, and the Supplement thereto in 1903, many records of rare and interesting birds have accumulated and are herewith published as a contribution to our knowledge of the avifauna of this state. The Western Willet, Arctic three-toed Woodpecker, Evening Grosbeak, and Nelson's Sparrow have been added to the list of the birds of the state. The breeding of Henslow's Sparrow, Black-throated Blue Warbler, Pine Warbler, Water Thrush, Winter Wren and Hermit Thrush has been established, while an increase in numbers of the Laughing Gull, Common Tern, Sparrow Hawk and Carolina Wren has been noted.

I am greatly indebted to Messrs. Charles B. Clarke, of Newport, Harry S. Champlin of Point Judith, Israel R. Sheldon of Pawtuxet, Miss Elizabeth Dickens of Block Island, and others for specimens and valuable notes, and I take this opportunity of expressing my sincere thanks to them.

Gavia stellata. RED-THROATED LOON.— Adult birds are rarely seen on our coast. A male in full nuptial plumage was taken off Newport on the late date of May 21, 1908, by Mr. C. B. Clarke.

Cephus grylle. BLACK GUILLEMOT. An extremely rare and irregular winter visitant. Additional records are as follows. A male shot January 1, 1906 off Sakonnet Point, a female December 30, 1906, at Newport and a male November 28, 1909, at Cormorant Rock off Newport. These birds, all in the gray winter plumage, were collected by Mr. C. B. Clarke and

the last two are in my collection. Mr. Clarke writing of their habits says, "I shot five birds in all in 1909 at Cormorant Rock, all single birds shot over duck decoys. They decoyed readily, but I do not know whether they would alight to them as I never gave them a chance. I have, however, before this, seen them swimming in the water, resembling a grebe very much but they are somewhat quicker in diving. One that I shot was under water before the shot got there and when he came up he was flying. He did n't go very far for the next shot brought him down."

Alca torda. RAZOR-BILLED AUK.—A male was sent me in the meat, shot by Mr. C. B. Clarke at Newport on January 9, 1909. This bird was minus a tarsus and foot lost in early life. Upon skinning I found eighteen "Silver sides" (*Menidia gracilis*) a small fish two to three inches in length, in its gullet.

Stercorarius pomarinus. POMARINE JAEGER.—One seen chasing a Tern on August 9, 1909, at Quonochontaug. Jaegers were fairly common during August and early September, 1910. The first ones noted were seen August 18th, at Quonochontaug, and three or four followed the Terns every day, making them drop the fish they were carrying to their young, which the Jaegers quickly secured. Eight were the most seen in a day, on August 26th. I have referred them to this species as being the commoner one in our waters. Two immature birds and an adult in fall plumage, shot at Point Judith on September 13, 1910, by Mr. H. S. Champlin, were sent to me in the meat.

Stercorarius parasiticus. PARASITIC JAEGER.—An additional record for this uncommon migrant is one taken by Mr. C. B. Clarke at Eastons Pond, Newport, on the late date of November 27, 1909. It was sent to me in the meat in a very emaciated condition.

Larus atricilla. LAUGHING GULL.—Formerly a rare migrant, this bird has rapidly increased in numbers since 1909 and during August and early September of 1912 it was fairly common along the south coast of this state, most of the birds being in immature plumage. An adult bird appeared off Quonochontaug on August 7, 1909, and up to the 27th of that month seventeen individuals were seen at various times in company with the Common Terns with which they mingled on the sand flats in Quonochontaug Pond. I shot a young female August 21, 1910, in this locality. Eight birds, the first noted in 1912 at Quonochontaug, were flying west along shore on August 4th. On the afternoon of August 19th a flight of Herring Gulls occurred on our coast and among them I saw about twenty Laughing Gulls in bunches of twos and threes all flying in a southwesterly direction toward Long Island Sound. Mr. Israel R. Sheldon reported that there were on August 22, 1912, about one hundred Laughing Gulls with at least two thousand Common Terns at Point Judith. An adult male and female were shot May 17, 1908, at Point Judith by Mr. C. B. Clarke and on May 26, 1912, I saw three adults on the Sakonnet River near Tiverton.

Sterna hirundo. COMMON TERN.—The protection given the Terns on their breeding grounds has led to a notable increase in their numbers along

our coast since 1907. Early in August of each year since, both old and young birds appear in daily increasing numbers, coming to the sand flats in Brightman, Quonochontaug and Charlestown Ponds and the breakwater at Point Judith where they find safe roosting places. Adult birds are flying back and forth all day over the ocean and ponds bringing small fish to the young birds congregated on the flats, and as the young get stronger of wing they accompany the adults on their fishing trips. On August 17, 1910, there were about a thousand birds on the Quonochontaug flats, and from information gathered from others, I estimated that there were at least seven thousand birds between Point Judith and Watch Hill daily during August, 1910. They all departed between September 5th and 8th. A large flight occurred on September 2, 1911. From early morning until sunset flocks of from five to sixty coming from the east, were flying continuously over the ocean and Quonochontaug Pond in a south-westerly direction. After this but few were noted, a lone individual being seen on November 5th. There must have been a great many thousand birds in this flight. During 1912 they were not as abundant as in the two previous years, but still were very plentiful.

Sterna fuscata. SOOTY TERN.—A male in immature plumage was shot by Mr. C. B. Clarke on January 8, 1908, at Coddington Point, Newport, and is now mounted in my collection. This is the fourth record for this state. It is rather remarkable that a southern bird should stray so far north in winter.

Hydrochelidon nigra surinamensis. BLACK TERN.—A flight of this species occurred on September 3, 1906, at Point Judith lasting nearly all day. The wind blew about thirty miles an hour from the southwest accompanied by rain. Small flocks were flying over the Point every few minutes coming from the northeast and flying into the wind. Late in the afternoon the wind shifted to light northwest and the flight ceased, but with the change in wind the terns commenced to appear in great numbers over the ocean coming from the southwest and leisurely feeding between Point Judith and Newport. The next morning none were seen, all having departed in the night. I shot a male in nearly adult plumage, the only one seen, all the others being immature birds.

Puffinus borealis. CORY'S SHEARWATER.—Six of this species were shot from the deck of a tug boat between Watch Hill and Point Judith in Block Island sound on October 14, 1907, by Mr. C. B. Clarke. One was shot at Point Judith by H. S. Champlin on September 13, 1910. Mr. Champlin informs me that they were quite numerous in August and early September in company with Jaegers, inside the breakwater.

Anas rubripes. BLACK DUCK.—A nest containing nine fresh eggs was found in the marsh at Point Judith on May 7, 1911. The female a small bird with green legs, flushed when I was about eight feet from her. On May 29, 1910, I found five young about three weeks old in the same marsh, two of which were caught with the aid of a dog and after banding, were liberated. Miss Elizabeth Dickens of Block Island informs me that she

had a pure white albino in her flock of twenty-three domesticated Black Ducks.

Chaulelasmus streperus. GADWALL.—This is one of the rarest ducks that visit us in the fall there being but two or three records of its occurrence in the state. An immature male was shot in a small fresh water pond at Point Judith on November 11, 1909, by Mr. Leon Champlin, from whom I secured it in the meat for my collection. The bird was alone at the time.

Mareca americana. BALDPATE.—While a few of this species are taken every fall on our coast it is uncommon in winter and early spring. A male and female in full nuptial plumage were shot by Mr. C. B. Clarke near Newport on March 19, 1909. Both birds were added to my collection. Mr. Harold N. Gibbs shot a female at Barrington on January 21, 1913.

Spatula clypeata. SHOVELLER.—The following records of this rare migrant are of interest. A young female was shot at Point Judith, September 24, 1908, and an immature male at Newport, November 7, 1908, by Mr. C. B. Clarke. A male and female in full nuptial plumage were shot in a small fresh water pond at Point Judith on April 29, 1911, by Mr. Leon Champlin who sent them to me in the flesh. They had been observed for a week previously in this pond in company with a pair of Black Ducks.

Marila valisineria. CANVAS-BACK.—A few are taken every fall in Charlestown Pond in company with the large flocks of Redheads that occur there more or less regularly in November. Two males in adult plumage were shot in a fresh water pond in Middletown, R. I., on November 18, 1905, one of which is in the Park Museum in Providence and the other in my collection.

Histrionicus histrionicus. HARLEQUIN DUCK.—Mr. C. B. Clarke informs me that he saw a bunch of a dozen in December, 1904, in the vicinity of Cormorant Rock, Newport, and that he shot two immature males on December 17, 1905, at the same locality. He had a very good chance to watch this pair as he lay concealed behind a rock. Speaking of their habits he says, "they are the most graceful birds in the water that I ever saw. They have a very peculiar way of swimming, moving along in a zigzag manner with their heads bobbing up and down as if in search of food. The rougher the water the better they seem to like it. Most ducks will dive through a breaker but the Harlequin swims right through as if the breaker did not exist." Mr. C. M. Hughes of Newport informed me that an adult male, two immature males and a female were shot at Cormorant Rock, Newport, on February 9, 1911. I purchased the adult male which is in full nuptial plumage.

Somateria spectabilis. KING EIDER.—This species occurs rarely among the flocks of American Eiders that resort to the vicinity of Cormorant Rock, Newport. Mr. C. B. Clarke during some fifteen years shooting at this locality has taken three specimens in that time. Two of these are in my collection, a male in post nuptial plumage of a mature bird probably two years or more old, shot January 21, 1909, and a female taken February 16, 1911.

Chen hyperboreus hyperboreus. LESSER SNOW GOOSE.— One of this species in immature plumage was shot on January 10, 1909, near a spring on Hope Island in Narragansett Bay and is now in the collection of Dr. Horace P. Beck of Newport, mounted on a panel as a "dead game" piece. The bird was in a very emaciated condition with its stomach empty, and when skinned was found to have one of its wings recently broken, and while it was quite well knit together, probably accounts for its being in this locality in midwinter. It measured as follows: wing 16 inches, tarsus 3.37 inches, bill 2.25 inches.

Olor columbianus. WHISTLING SWAN.— Two were seen by one of the Life Saving Crew at the Quonochontaug Station flying west over the ocean in October, 1908. Mr. Frank D. Lisle of Providence, on September 7, 1910, saw a swan in Trustom Pond in South Kingstown, gray in color with reddish head and neck. He watched it for some time through field glasses until it flew away. Mr. C. B. Clarke wrote me that during the first week of September, 1910, a swan flew over the marsh at Point Judith. In all probability the above were of this species. Miss Elizabeth Dickens of Block Island has given me the following information in regard to six swans that were shot on November 16, 1911, in Fresh Pond, the largest fresh water pond on the island. She says, "the wind was blowing at least 50 miles per hour from the west and they had alighted in the pond. Mr. Howard Stedman shot two of them, young birds which still retained a part of their gray plumage. L. Lewis Littlefield shot the remaining four, which had flown to the farther end of the pond when the first two were killed. He ended the lives of two adult birds with the first shell. The two that were left arose, but soon alighted beside the dead ones on the surface of the pond where Mr. Littlefield killed them also. Two of the six were sent to Newport, one of which was mounted and is in the possession of Mr. Clarke Burdick. The others were plucked and eaten. A seventh bird was killed in Harbor Pond, Block Island, December 28th or 29th, 1911, by Lycurgus Negus. It is a nearly adult bird still retaining gray feathers on the head and neck." This one was mounted and is now in the Park Museum at Providence.

Ardea herodias herodias. GREAT BLUE HERON.— A very interesting account of the flights of this heron on Block Island was recently given me by Miss Elizabeth Dickens. "On November 12, 1910, a flock of twelve appeared about 8:30 A. M. After circling awhile like gulls playing in air, they dropped down on the edge of the bluff, and they were a sight. Of course the gunners got after them and they departed. All the forenoon they came from the west in flocks of from two to sixty. I counted forty in one flock and sixty in another, that were in sight at one time. The Life Savers said this was one flock until their shooting divided them. Last fall, 1911, there was a similar flight though not so large, at about the same time."

Rallus elegans. KING RAIL.— Three records of this large rail all taken in winter are given by Howe & Sturtevant in their 'Birds of Rhode Island.'

Since these were recorded a number of specimens have been taken all in summer and fall, as follows: a male and female were shot May 3, 1904, and a male May 9, 1904, all at Eastons Pond, Newport, by Mr. C. B. Clarke. On October 13, 1907, Mr. H. S. Champlin of Point Judith, while searching in the long marsh grass for a duck he had just shot, stepped on and caught a female of this species. This specimen was sent to me in the meat. Mr. C. B. Clarke sent me four birds in 1909 from Point Judith shot on the following dates, August 26th, a female, September 3rd, an adult male which was moulting, patches of chestnut being mixed with worn gray feathers on the throat and breast; September 12th, a male and December 12th, a male. With the exception of the one that was moulting the others were in fresh plumage and I think were birds of the year. Mr. Clarke informed me that they were all shot in the "cattails" in the vicinity of a fresh water puddle and from the manner of their occurrence is led to believe that a pair nested.

Rallus virginianus. VIRGINIA RAIL.—This rail nests much earlier than is usually supposed. On June 4, 1906, I found a nest at Quonochontaug with one young and three eggs pipped, which were empty upon my return in an hour. May 26, 1907, a nest was found at Point Judith with eight eggs, four of which were within two days of hatching, three would have hatched in four days and one was infertile. May 29, 1910, at Point Judith, with the aid of a dog I caught two young at least two weeks old and another was seen running through the cattails. The eggs from which they were hatched must have been laid late in April.

Porzana carolina. SORA.—The Sora is rarer than the Virginia Rail in the breeding season in this state. A nest with fourteen eggs was found June 17, 1906, at Point Judith by H. S. Champlin. The nest was visited again on the 19th when it was found empty, the eggs having hatched in the meantime. On May 29, 1910, I found a nest with nine fresh eggs at Point Judith near a small fresh water pond. It was built in a small clump of "cattails" in a very open spot and readily seen from all sides.

Coturnicops noveboracensis. YELLOW RAIL.—The Yellow Rail occurs quite regularly during the fall migration. The following records of birds all secured at Point Judith are of interest. Mr. C. B. Clarke shot two October 10, 1908, and Mr. William T. Bowler took two more on October 15th of the same year. These birds were not saved. October 15, 1909, Mr. Clarke took a male which he sent to me and it is now in my collection. Four were killed in October, 1910, by Mr. William T. Bowler. September 30, 1911, a female was shot by Mr. Charles L. Knowles in a fresh water run, and on October 1, 1911, another specimen was caught by a dog and one other seen. The last two birds were sent to me in the meat by Mr. I. R. Sheldon who writes as follows. "I do not think the Yellow Rail is anywhere near so rare as recorded. Out of thirty rails that I have seen this fall at Point Judith, four were this species, ten Virginias and sixteen Soras. They are very hard to flush and for this reason I think less rare than supposed to be. I have caught two birds with my hands." Mr. W. T. Bowler shot one, October 15, 1911, at Newport.

Steganopus tricolor. WILSON'S PHALAROPE.—I took a male of this rare Phalarope at Quonochontaug on August 28, 1909. It came into my decoys at dusk, and alighted among them.

Macrorhamphus griseus scolopaceus. LONG-BILLED DOWITCHER.—A female of this rare shore bird was shot on September 25, 1908, by Mr. C. B. Clarke at Point Judith, which he sent to me in the meat and it is now in my collection. It measured as follows: wing 5.87 inches, tarsus 1.65 inches, bill 2.87 inches. Mr. Clarke informs me that twelve or fourteen years ago he shot a bunch of eleven of this species in the spring of the year on the Eastons Beach marsh at Newport, and that the above specimen is the only one he has seen since that time.

Micropalama himantopus. STILT SANDPIPER.—Some years this species occurs quite commonly during the fall migration and in others it is rare. During a flight at Point Judith on September 1, 1906, several were shot, all young birds. I shot a male in adult breeding plumage that came to my decoys on July 30, 1911, at Quonochontaug, R. I.

Pisobia maculata. PECTORAL SANDPIPER.—I took a very late bird at Point Judith marsh on November 2, 1902, the only one seen.

Pisobia bairdi. BAIRD'S SANDPIPER.—As this is one of our rarest Limicolae, individual records are of interest. I took a male August 14, 1907, and a female August 30, 1912, both at Quonochontaug. The latter was alone and came to my decoys when I imitated the call notes of the Pectoral Sandpiper.

Ereunetes mauri. WESTERN SANDPIPER.—Occurs sparingly among flocks of Least and Semipalmated Sandpipers. Out of a flock of a dozen "peep" I shot a young male on September 7, 1908, at Point Judith. At Quonochontaug in 1912, I shot three, a female August 23, a male each on August 24 and 26. These were all immature birds which were easily identified by their longer bills as they searched for food on the sand flats, among the flocks of "peep."

Limosa fedoa. MARBLED GODWIT.—An extremely rare straggler in this state. One was shot by a gunner named Merritt on September 7, 1908, at Sakonnet Point. The specimen was mounted and is in his possession.

Catoptrophorus semipalmatus inornatus. WESTERN WILLET.—The western form of the Willet has never been recorded as occurring in Rhode Island, yet doubtless all that have occurred in recent years belong to this subspecies. It occurs as a regular fall migrant, some years more abundant than others. The first bird that I have a record of, I shot on August 9, 1905, at Quonochontaug. A flock of eight came to my decoys on August 18, 1907, at the same place, two of which I shot, both females. In August, 1912, they were more abundant than I have ever seen them, some eighteen having been seen between the 9th and 23rd on the Quonochontaug marsh. Mr. I. R. Sheldon informed me that he saw twenty-five August 23 on the Point Judith marsh. All of the birds that I have shot were in immature plumage. Earliest bird noted on August 5, 1906. I have

never seen one of the eastern form in this state and do not know of any in local collections.

Machetes pugnax. RUFF.—Mr. William T. Bowler shot an immature female on September 7, 1909, on the Point Judith marsh, which was in company with two Pectoral Sandpipers. This is the third record for the state and is now in my collection.

Tryngites subruficollis. BUFF-BREASTED SANDPIPER.—Additional records for this rare fall migrant are as follows: Mr. I. R. Sheldon shot one near the "causeway" on the island in Point Judith Pond on September 2, 1905. Mr. C. B. Clarke shot a female September 23, 1904, at Little Compton, which I purchased of him for my collection. He took another specimen at the same locality on the early date of July 22, 1906.

Charadrius dominicus dominicus. GOLDEN PLOVER.—This fall migrant is fast becoming one of our rarest shore birds. In August and September of 1909, quite a number were taken on the Point Judith marsh. I have two females, shot August 21, and a male and female shot August 30, of that year which are in worn breeding plumage and moulting. About half of the feathers on the throat and belly are black, the rest white, giving the bird a mottled appearance. Mr. C. B. Clarke who obtained the birds informed me that during fifteen years shooting he has seen but very few in this plumage.

Ægialitis meloda. PIPING PLOVER.—The Piping Plover is an extremely rare summer resident and migrant in this state. A pair have bred for five years on a pebbly beach in Newport County. I was informed of their presence at this spot in 1908, and visited the locality on June 4, 1909, readily found the adults and judged from their actions that they had young. In 1910 I paid them a second visit on June 19, and after a wait of an hour under a blind, I saw three young a few days old running along the beach. June 4, 1911, I found them in the same spot and the female led me a chase of a hundred yards, acting as if she had a broken wing. I spent an hour under the umbrella blind, and at last saw two young less than a week old feeding along the sandy beach. The old birds did not come near the young at any time and were very wary. My last trip was on May 26, 1912, found the birds as usual, and hiding under the blind, in less than three minutes the female ran up the beach beyond high water mark and vanished from sight among the pebbles, which she so closely resembled in color. It took me but a moment to reach the spot where I saw her fade from sight, and there in a slight hollow in the sand on a few pieces of broken shells were four eggs, which I photographed. It is remarkable, that one of the Limicola family, which has to run the gauntlet of such a host of gunners in their migration, should safely return to nest year after year in the same identical spot.

Ectopistes migratorius. PASSENGER PIGEON.—There is no definite breeding record that I can find of this bird though it formerly bred here in abundance. In Forbush's 'History of the Game Birds, Water Fowl and Shore Birds' on page 346 I find "Roger Williams (1643) says that the

Pigeons bred abundantly in Rhode Island in the Pigeon Countrie." Mr. F. T. Jencks of West Barrington, R. I., our veteran ornithologist, has written me as follows: "Once in West Greenwich, a Wild Pigeon flew from a pine tree to another near by and I shot it, a beautiful male. I went and looked where he flew from and found a nest with one egg which I took. I don't remember what disposition was made of these specimens. It was close to 1880, probably in May, but more likely before 1880 than afterward. Shooting Wild Pigeons and Mourning Doves are two different propositions, the first was easy the latter generally not." I have in my collection a mounted adult male taken on the "Whittaker" grounds in Cranston in October, 1854, by Percia Aldrich and mounted by him. What is undoubtedly the last one shot in this state is a young bird taken by Walter A. Angell November 2, 1886, in Cranston, now in my collection. Mr. William A. Sprague, of Providence, saw one sitting on a telegraph wire in Glocester on September 25, 1888, which allowed a near approach and remained on the wire until he was some distance away. This is the last instance that I know of its occurrence here.

Cathartes aura septentrionalis. TURKEY VULTURE.—I have a mounted specimen in my collection shot by Le Roy Knowles at Point Judith on June 16, 1908. When first seen the bird was perched on a stone wall and appeared to be much interested in Mr. Knowles' chickens. Fearing that the vulture might molest them, Mr. Knowles shot him. Miss Elizabeth Dickens has written me that one was shot on Block Island, April 12, 1912, and was mounted and in the possession of Lyeurgus Negus.

Falco peregrinus anatum. DUCK HAWK.—The following very interesting account of the occurrence of this species on Block Island was given me by Miss Elizabeth Dickens. "Grey Bonnet" the tyrannus falcon, appeared here April 26, 1912. He is a foeman worthy of my steel, but I've never been able to kill one yet although I have made the feathers fly a number of times. One can't but admire his wisdom and cunning, and the wonderful feats he performs in air. They are very common with us both spring and fall. Have recorded forty-six during the fall of 1912."

Falco sparverius sparverius. SPARROW HAWK.—Recorded by Howe & Sturtevant in 'Birds of Rhode Island' as an uncommon summer resident. There has been a decided increase in their numbers during the last ten years, and now they may be called a regular summer resident, breeding locally and often wintering. I took a set of four fresh eggs on May 26, 1903, in Warwick which were laid in a hollow cavity in a dead tree. A pair occupied an old woodpecker's hole in the side of an ice house in Cranston and on May 24, 1907, I found a set of five eggs incubated ten days. The female would not leave the nest and I had to remove the eggs from under her with a scoop net. Another pair were in an old flicker's hole in a telegraph pole eight feet up, beside a much travelled highway in Cranston. It contained four fresh eggs on May 14, 1911. The bird was in the nest and would not leave. Inserting a scoop net she struck at and grasped it with her feet and was pulled out clinging to it. I saw two individuals in Janu-

ary, 1911, and a pair which were apparently mated, on February 22, of the same year, all in Warwick.

Cryptoglaux acadica acadica. SAW-WHET OWL.—An additional record of this rare winter visitor is a female taken on November 1, 1910, at Point Judith by Mr. H. S. Champlin.

Picoides arcticus. ARCTIC THREE-TOED WOODPECKER.—An adult male was shot in Barrington on December 25, 1905, by a boy from whom it was purchased by Angell & Cash, taxidermists in Providence. While in a grove of pitch pines on Potowomut Neck in Warwick on February 22, 1911, I saw one of this species busily engaged in digging out a grub from the trunk of a dead pine tree. I fired at the bird but he flew off unhurt. I returned to this tree later on and found the bird at work, fifteen feet up the trunk. He did not mind my presence in the least and let me approach the foot of the tree. Another attempt to collect it was unsuccessful and I did not see the bird again. These are the first two instances of their occurrence in this state.

Nuttallornis borealis. OLIVE-SIDED FLYCATCHER.—I saw one perched on the topmost limb of a large dead white pine in Charlestown on June 5, 1910. When some distance from the tree I heard its loud call notes and upon approaching, it flew out of sight. This is the first one I have ever seen and it is an extremely rare migrant with us.

Corvus brachyrhynchos brachyrhynchos. CROW.—Dr. H. P. Beck of Newport kindly permits me to record an albino that was killed on Prudence Island in December, 1910. The bird is mounted in his collection.

Sturnus vulgaris. STARLING.—This old world species first introduced into New York City made its appearance in this state at Silver Spring in East Providence in the summer of 1908. I was informed of their presence here by Mr. I. R. Sheldon who saw seven or eight birds and said they had nested there that summer. I saw a flock of thirty-two in an elm tree in Warwick on December 17, 1911. Prof. H. E. Walter of Brown University told me of seeing seven on April 2, 1912, in East Providence and that he saw two enter holes in trees. During December of 1912 about a dozen were reported as roosting in the steeple of the church in Rumford. Miss Elizabeth Dickens wrote me that her father saw the first Starling on Block Island on October 2, 1912, and on November 23, 1912, a flock of twenty were seen.

Molothrus ater ater. COWBIRD.—A male and female were seen on Block Island, January 10, 1913, by Miss Elizabeth Dickens. The weather had been very mild up to this time.

Euphagus carolinus. RUSTY BLACKBIRD.—Two of this species were feeding along the banks of a running brook in Warwick on February 4, 1912, one of which I secured, a male now in my collection. The weather had been very severe during January, and all nature was encased in snow and ice. This is the first record for this bird wintering with us.

Hesperiphona vespertina vespertina. EVENING GROSBEEK.—Miss Anna E. Cobb reported having seen a male on January 7, 1911, in Meshanti-

cut Park, Cranston. A flock of five females and two males were observed in Woonsocket on January 13, 1911, and for several days thereafter, as recorded in the March-April 1911 "Bird-Lore." These are the first instances of its occurrence in this state.

Loxia leucoptera. WHITE-WINGED CROSSBILL.—A flock of forty of this uncommon winter visitor were reported feeding on hemlock cones in Johnston, November 20, 1906. I visited this locality on November 24 and secured three females from a flock of twenty-four. On December 22 I shot two males at the same place and saw twelve others. They were last seen on January 13, 1907. Five females were on the ground under a large hemlock picking up the seeds that had fallen from the cones. They were very tame and allowed me to come within two feet of them before they flew into the lower branches of the tree.

Passerherbulus henslowi henslowi. HENSLOW'S SPARROW.—A rare local summer resident occurring only in the southern part of the state but principally in the town of Charlestown. Perched on a weed stalk, fence, stone wall or rock in some old pasture grown up to weeds and briers, its plain little song resembling the words "se-lick" may be heard at all hours of the day during the breeding season. I heard two males singing at Bridgetown, May 10, 1903, one August 5, 1905, near Niantic, two at Quonochontaug May 11, 1906, one May 9, 1909, at Kingston, and May 13, 1910, in a field of some twenty acres in extent in Charlestown I heard seven singing. On June 5, 1910, I visited the Charlestown locality, and with the aid of my son C. H. Smith Hathaway we dragged the fields with a rope in an endeavor to find a nest, but with no result other than to collect two males. In 1911 on May 28th, my son and I again dragged the old pasture, and we had not proceeded more than a hundred feet when a female flushed from a nest containing three fresh eggs and one of the Cowbird. We left the eggs unmolested, continued our dragging and in about two hours flushed another female from a nest with four eggs in exactly the same situation as the first one, set in a cluster of dead grass and very open to view. The nests were built entirely of grasses lined with fine dead grasses, quite deeply cupped. I endeavored to collect the last female but was unsuccessful. She led me a long chase, flying low from one clump of bayberry bushes to another and instantly diving out of sight, finally disappearing. One very distinctive character noted was the chestnut brown color of the bird in flight. The last set found was incubated some seven or eight days. Returning to the first nest I carefully approached and succeeded in getting within two feet of it. The bird was on, in plain sight, and I could see the olive green feathers of the nape and the chestnut brown of the back with black streaks. In attempting to touch her she sprang six feet into the air flirting and spreading her sharp pointed tail feathers, and flew in a zigzag manner into a nearby bayberry bush. In each instance the males were singing within a hundred feet of the nest. These are the first records of its breeding in this state.

Passerherbulus nelsoni nelsoni. NELSON'S SPARROW.—Nelson's Sparrow occurs rarely during the fall migration in company with the

Acadians. One which I shot October 15, 1905 in the Charlestown Beach marsh was kindly identified by Mr. William Brewster as "nearly typical" of this subspecies. I am indebted to Dr. C. W. Richmond of the U. S. National Museum for the identification of a male which I took at Quonochontaug on October 17, 1909. These are the first records for this state and both specimens are in my collection.

***Passerherbulus nelsoni subvirgatus*.** ACADIAN SHARP-TAILED SPARROW.—A common fall migrant along the coast occurring in all the salt marshes. I have two males and a partial albino which I shot October 15, 1905, in the Charlestown Beach marsh, and a male shot October 8, 1911, at Quonochontaug. It doubtless occurs as a spring migrant, but I have no record.

***Passerherbulus maritimus maritimus*.** SEASIDE SPARROW.—Occurs as an uncommon summer resident in nearly all of the salt marshes on our southern coast, variable in numbers in different years, due no doubt to the flooding of the marshes by rain. Two nests were found at Quonochontaug, June 16, 1907, one containing three eggs nearly ready to hatch, and the other with four eggs incubated eight days. The latter set is in my collection. The nests were well concealed in the short coarse dead marsh grass, just above the surface of the shallow water that covered a small part of the marsh to a depth of three or four inches. I took a female October 3, 1909, at Charlestown Beach, and a male October 12, 1912, at Quonochontaug.

***Zonotrichia albicollis*.** WHITE-THROATED SPARROW.—Winters occasionally. I saw five at Apponaug on February 12, 1911, feeding on the fruit of the barberry (*Berberis vulgaris*). Two were seen in a "cattail" swamp in Cranston, December 25, 1912, in company with a small flock of Tree Sparrows.

***Progne subis subis*.** PURPLE MARTIN.—The cold rainstorms of June, 1904, nearly exterminated the martins in this state. They have never regained their former abundance and I know of but few that nest with us. Doubtless, they would increase if suitable houses were put up to attract them. A small colony of a dozen pairs occupies bird houses in Shannock regularly every summer. I took a fresh set of five eggs on June 10, 1911, from a bird house in Charlestown which had two pairs for tenants.

***Lanius ludovicianus migrans*.** MIGRANT SHRIKE.—A rare migrant. At Quonochontaug, August 14, 1903, while perched on the limb of a dead tree, one was busily engaged eating a large grasshopper. It allowed me to approach within a few feet giving a good opportunity to identify it. Mr. F. T. Jencks shot one in Barrington on September 3rd of the same year. I saw one on a telephone wire August 26, 1912, at Quonochontaug but was unable to secure it. Miss Elizabeth Dickens of Block Island, in August, 1912, found one dead, killed by flying against a telephone wire, and saw five others.

***Vermivora celata celata*.** ORANGE-CROWNED WARBLER.—A male of this very rare migrant was shot by the late James W. Stainton in Cranston on May 17, 1892. It is now in the collection of Rhode Island birds in the Park Museum at Providence.

Dendroica caerulescens caerulescens. BLACK-THROATED BLUE WARBLER.— I first heard the song of this dainty little warbler on June 10, 1906, in a grove of white pines, hemlocks, and deciduous trees bordering on a swamp in the town of Burrillville. Beneath the trees a luxuriant growth of mountain laurel was just coming into bloom, and it seemed such a favorable locality for the birds to breed in, that I instituted a search for a nest, but did not succeed in finding one. I was in this locality on June 26, 1910, heard three males singing, and saw a female feeding a young Cowbird much larger than herself. May 30, 1911, I spent several hours hunting for a nest, found two old ones in low laurels and was on the point of abandoning the search, when a female flew up in front of me from her nest. It was built in the forks of a small laurel, ten inches above the ground, and contained four nearly fresh eggs. I sat down near the nest, and after a few moments, both male and female came within a few feet, giving me a good opportunity to study them at close range. This is the first record of its breeding in this state. A mile south of this locality I heard two more males singing on the day the nest was found. June 16, 1912, I heard three males singing in laurel growths in Exeter. It may now be called a rare local summer resident, breeding along the western border of the state.

Dendroica vigosii. PINE WARBLER.— The first authentic record of the breeding of this warbler was published in 'Bird Lore', Vol. XIII, no. 4, p. 187. I found a nest on May 27, 1911, in Coventry, containing five young a day or two old.

Seiurus noveboracensis noveboracensis. WATER-THRUSH.— Three or four pairs breed regularly each year in the swamp in Washington County where I first found their nest as described in 'The Auk' of October 1906. They are not as plentiful as at that time, due doubtless to the fact that the soil has almost completely fallen out of the roots in which they built their nests. A fresh set of five eggs was found at this locality on May 18, 1912.

Icteria virens virens. YELLOW-BREASTED CHAT.— Miss Elizabeth Dickens writes me that on August 22, 1912, there was a migration of Chats on Block Island, she having seen as many as fifty in a flock.

Thryothorus ludovicianus ludovicianus. CAROLINA WREN.— This species has increased in numbers during the last few years and may now be called a rare local summer and winter resident. Dr. Leon J. Cole informed me that he had heard two singing in Kingston, near Dr. Hadley's residence on April 3, 1910. I visited this locality on April 23rd and found one of the birds singing its loud "tea kettle" song from the topmost limb of a maple tree. Mr. E. D. Keith informed me that he had heard one singing on different days during February and March, 1911, in the Roger Williams Park swamp in Providence. Mr. R. C. Murphy heard one at different times in May, 1911, on Neutaconkanut Hill in Johnston.

Nannus hiemalis hiemalis. WINTER WREN.— On May 24, 1908, in company with Messrs. A. C. Bent of Taunton, Mass., and John Flanagan of Providence, I visited a swamp in Washington County to search for nests

of the Water Thrush, *Seiurus noveboracensis noveboracensis*. I soon found one in the upturned roots of a fallen tree with five eggs, and while waiting for my companions who were some distance from me, to come and see the nest, I inspected another upturned root a short distance from the first, and had the good luck to find a nest of the Louisiana Water-Thrush, *Seiurus motacilla*. This nest was in the lower right hand edge of the root about a foot above the water, and contained four eggs and two young just out of the shell. My companions having arrived at the spot, Mr. Flanagan called our attention to a Winter Wren that alighted on the root. We walked away a short distance and in a few moments she came in sight again with a caterpillar in her bill and disappeared among the roots. Going to the tree we soon found the wren's nest in the same roots with the nest of the Louisiana Water-Thrush, about four feet from it in the upper left hand edge. It was built in a cavity of the roots with weed stalks for a foundation, composed externally of green sphagnum moss, lined with soft grasses and a few white hairs of the Red Deer; globular in shape, with a small hole in the side for an entrance, it contained six young a week old. We heard the male singing its joyous, rippling song several times while we were in the vicinity of the nest. This is the first and only instance of its nesting in this state.

Cistothorus stellaris. SHORT-BILLED MARSH WREN.—Recorded in "Birds of Rhode Island" as a rare summer resident nesting at Newport. I have searched in several favorable localities for it, but have never heard or seen one. In the collection of the late Snowden Howland of Newport, now deposited in the American Museum of Natural History in New York City, is a set of five eggs taken in the "cattails" of Eastons Pond, Newport, on June 7, 1879.

Hylocichla guttata pallasii. HERMIT THRUSH.—Formerly known as a common migrant the Hermit Thrush has in recent years become a regular summer resident, locally dispersed, and breeding. The first nest was found by Mr. Walter A. Angell in Kent County on June 14, 1905, and contained five eggs incubated one week. Four more nests were found by him in the same locality one of which he kindly gave me the location of, and which I visited on July 10, 1907. I found the female on the nest and readily identified her. The nest was on the ground at the foot of a small laurel and contained three fresh eggs. On June 8, 1907, I heard two males singing in pitch pine woods in Coventry. Three males were singing on May 25, 1909, in South Kingstown and I have heard two or three every year in May and June in the same locality. June 12, 1909, I found a nest in Coventry with three nearly fresh eggs. It was on the ground between two small pine saplings not over a foot high, composed of dead leaves, weed stems, shreds of bark, and pine needles, and lined entirely with pine needles. A very bulky nest with thick walls and well rounded edge. Ten individuals were noted at various localities in 1909, their favorite haunts being the dry pitch pine and scrub oak regions.

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CORY'S LEAST BITTERN (*Ixobrychus neoxenus*).

CORY'S LEAST BITTERN AT ITHACA, N. Y.

BY ARTHUR A. ALLEN.

Plate XXI.

On the afternoon of May 17, while trudging through the marsh that lies at the head of Cayuga Lake, I flushed a strange bird from the cat-tails about fifteen feet before me. Its size and manner of flight were those of the Least Bittern, but it had none of the buffy markings so characteristic of that species. Instead its neck and breast appeared rich chestnut, and the wings uniformly dark. After the usual manner of the Least Bittern, it flew about one hundred yards and dropped again into the flags. Proceeding toward the spot, I called to Mr. Francis Harper, who was tramping through an adjoining part of the marsh, and we advanced together searching the waist-deep cat-tails for the bird. For a time we looked in vain, but finally it flushed about twenty feet from where we were standing. Despairing of finding it again in the flags while alive, I took a parting shot at it with a collecting pistol and succeeded in bringing it down. Upon picking it up, we found that it was a Cory's Least Bittern (*Ixobrychus exilis*). No vital spot had been touched by the shot, so we resolved to keep it alive as long as possible, or at least until Mr. Fuertes could find time to make sketches of the living bird, an opportunity not frequently occurring with this species. Returning to the Field Station, we placed the Bittern in an empty pail and left it alone for several minutes. When we returned, it fluttered excitedly and gave a hoarse cry very similar to that of the Least Bittern which Chapman has described as "a low frightened *qua*." It struck me, at the time, as somewhat harsher than that of the Least Bittern, but not having heard the latter recently, I might have been mistaken. This was the only sound emitted during its three days of captivity.

The bird proved a most interesting though untamable pet. One exercised care in approaching the box in which it was kept, for the long neck and spear-like bill were darted out with alarming rapidity, and with force sufficient to draw blood. Its usual atti-

tude was with the neck drawn back and the bill inclined slightly upward in characteristic heron pose. Occasionally, when slightly alarmed, it gradually extended its neck until it was stretched upward to its full length, the bill and even the body then assuming an almost vertical position. This was sometimes accomplished by movements so slow that it was difficult to perceive them with the eye. The resulting figure of the bird, as it faced the direction from which the disturbance arose, was nearly as slender as a rush and nearly as inconspicuous. When fully extended, the bittern sometimes slowly rotated until it had surveyed all sides with its piercing yellow eyes. With its bill pointed directly upward and its brilliant eyes directed forward past the angle of the mouth, it presented a very odd appearance. If the disturber next approached, the long neck subsided, the body settled, the feathers ruffled, the wings drooped, and the primaries spread until the bird seemed several times its original size. The bill was always held more or less vertical, except when directed in vicious jabs toward the observer. If one now continued to approach, the bittern swayed from side to side as though with excitement, its feathers fairly bristling and its diabolical eyes shining. If left alone for a time, it gradually assumed a more natural pose. A sudden sound had quite the reverse effect from that of the slight disturbance. Instead of extending its neck, it quickly crouched and drew its feathers very close to the body until it looked but one-half its natural size. The accompanying photographs show these poses well, if one allows for an unnatural drooping of the wing resulting from a break at the elbow joint.

The bittern was kept in a box about eight inches deep, containing a layer of sawdust and a shallow dish of water. In this dish were placed some small fish and tadpoles. Aside from the disappearance of one of the minnows while we were out of the room, there were no apparent signs of interest shown by the Bittern in the proffered food. Nor would it at first swallow any of the fish placed in its bill, unless they were directed well down into its throat when they disappeared automatically. On the second day, however, it lost some of its timidity, and twice it swallowed small fish placed crosswise in its bill. The function of the minute serrations on the mandibles was well demonstrated at these times, for the bird showed no difficulty in holding the slippery fish no matter

how much it struggled. After each feeding the bird became very much excited, swaying from side to side and bristling up all of its feathers, especially those of the crown and nape.

In spite of its crippled condition, the bittern showed great activity when left alone, and several times escaped from its box, which was left uncovered because of the bird's assumed helpless condition. The first time it not only climbed out of the box, but also managed to get down to the floor from the table upon which it was standing. Just how this was accomplished, with both wings and one leg broken, was not discovered since it remained quiet as long as any one was near. After the third day of its captivity, when it seemed to be losing in strength and lustre of plumage, and after Mr. Fuertes had made such studies as he desired, it was sent away to be mounted.

Allowing for six specimens from Florida, sixteen from Toronto, two from Michigan, and one each from Massachusetts, Wisconsin, and Ohio, this is the twenty-eighth recorded specimen of Cory's Least Bittern. It is a female in good plumage, and shows none of the albinistic tendencies observed in so many of the previous specimens.

AN ANNOTATED LIST OF THE BIRDS OF SANBORN COUNTY, SOUTHEAST-CENTRAL SOUTH DAKOTA.

BY STEPHEN SARGENT VISHER.

ONLY two lists of the birds of portions of eastern South Dakota have so far been published. 'Birds of the Coteau des Prairies' (the lake region of the northeastern corner) by C. E. McChesney,¹ and 'The Birds of Extreme Southeastern Dakota' by G. S. Agersborg.²

¹ One hundred species based on one year's work were given in 'Forest and Stream' for 1871. A more complete list of 152 species is to be found in Bulletin 5, United States Geological and Geological Survey of the Territories, 1875.

² A list, revised by W. W. Cooke, of 225 species observed mainly in the vicinity of Vermilion, in 'The Auk,' 1885.

The following list deals with an area which lies some fifty miles west of midway between the above mentioned regions. It is based on observations of the writer during the past fifteen years.

Sanborn County is located in the southeastern corner of central South Dakota. The Dakota or James river bisects it from north to south. It is a glaciated region, and in the main, a level plain except for the channel of the river and the main creeks. The rest of the area is poorly or not at all drained. There are hundreds of lake beds which contain water at certain seasons or throughout the year in wet periods. The largest and most permanent of these are Calahan Lake, twelve miles northeast of Forestburg, Kelley's Lake, five miles east of Forestburg, Artesian Lake, near the town of Artesian, Letcher Lake, near the town of Letcher, and Visher's Lake, near Forestburg. Long Lake, some five miles southwest of Forestburg, formerly was a great expanse of water. It has now been drained. None of these contain as much as a square mile of water.

The trees of the area are found in native groves along the river and the lower portions of the creeks and in small artificial groves scattered over the upland. The common species are the ash, elm, hackberry, boxelder, willow and cottonwood. Plum and choke-cherry thickets are frequent.

A large portion of the upland is at present cultivated, but there are considerable tracts along the streams and in the sandy region southwest of Forestburg which are still open. Forestburg is centrally located. Artesian is eleven miles east and Woonsocket is nine miles west on the C. M. & St. P. railroad. Letcher is ten miles southwest on another line of the same railroad. In size, the county is twenty-four miles square. The elevation of the area averages 1300 feet above sea level.

The most abundant birds of the treeless portions of the plains are the Western Meadowlark, Prairie Horned Lark, Upland Plover, Prairie Chicken, Marsh and Swainson's Hawks, Short-eared and Burrowing Owls, Sennett's Nighthawk, Bobolink, Cowbird, Chestnut-collared Longspur, Western Vesper Sparrow, Western Grasshopper Sparrow, Dickcissel, and Lark Bunting.

The birds most frequently found nesting in the upland are the Bob-white, Western Mourning Dove, Sparrow Hawk, Flicker,

Kingbird, Arkansas Kingbird, Traill's Flycatcher, Crow, Bronzed Grackle, Orchard Oriole, Goldfinch, Lark Sparrow, Chipping Sparrow, White-rumped Shrike, Yellow Warbler, Catbird and Brown Thrasher.

In addition the following are common in the groves along the river: Black-crowned Night Heron, Western Red-tailed Hawk, Screech Owl, Cuckoos, Hairy and Downy Woodpecker, Blue Jay, Rose-breasted Goshawk, Song Sparrow, Towhee, Western Yellowthroat and Western House Wren.

Species which nest plentifully about the ponds and the small lakes are the Eared Grebe, Franklin's Gull, Black Tern, Baldpate, Blue-winged Teal, Shoveller, Pintail, Bittern, Virginia Rail, Sora, Coot, Wilson's Phalarope, Killdeer, Yellow-headed Blackbird, and Thick-billed Red-wing. Kingfishers are numerous along the river. Several additional species nest on large lakes in adjacent counties.

A number of specimens of birds observed in Sanborn County and collected either there, or near Nemo in Hutchinson County, (also in the Dakota Valley, but lying a short distance south of Sanborn), or in other localities as far or further from the center of distribution of the species, have been submitted to the Biological Survey for verification. The identifications were chiefly made by H. C. Oberholser. It has been thought desirable to append in brackets the known data concerning some of these museum specimens.

1. ***Æchomorphus occidentalis***. WESTERN GREBE.—A frequent migrant. [Hamlin County, Nov. 10, H. E. Lee who reports their nesting there.]
2. ***Colymbus holboëlli***. HOLBØELL'S GREBE.—A common migrant.
3. ***Colymbus auritus***. HORNED GREBE.—Common during migrations.
4. ***Colymbus nigricollis californicus***. EARED GREBE.—A common summer resident of the larger bodies of water.
5. ***Podilymbus podiceps***. PIED-BILLED GREBE.—Breeds less abundantly than the Eared Grebe.
6. ***Gavia immer***. LOON.—A tolerably common migrant.
7. ***Larus argentatus***. HERRING GULL.—A small number of these gulls are seen each spring and fall.
8. ***Larus delawarensis***. RING-BILLED GULL.—A common migrant.
9. ***Larus franklini***. FRANKLIN'S GULL.—Large flocks are frequently seen during the summer. They seem to stray considerable distances away

from their nesting sites.—For example, we saw them one summer many times near Forestburg, though I believe none of them then nested within twenty miles.

10. *Sterna forsteri*. FORSTER'S TERN.—Occasionally common during migrations.

11. *Sterna hirundo*. COMMON TERN.—Frequent in migrations.

12. *Hydrochelidon nigra surinamensis*. BLACK TERN.—Breeds abundantly on all marshes and lakes, arrives April 20, departs in October.

13. *Phalacrocorax auritus auritus*. DOUBLE-CRESTED CORMORANT.—A tolerably common migrant during April and October.

14. *Pelecanus erythrorhynchos*. WHITE PELICAN.—An abundant migrant, passing in large flocks during April and late September and October.

15. *Mergus americanus*. MERGANSER.—A rather rare migrant.

16. *Mergus serrator*. RED-BREADED MERGANSER.—A common migrant.

17. *Lophodytes cucullatus*. HOODED MERGANSER.—A common migrant, especially numerous along the Dakota river.

18. *Anas platyrhynchos*. MALLARD.—A very abundant migrant, and quite common as a breeder. Nests found. Mallards are occasionally seen late in February, but are not very abundant until late in March.

19. *Anas rubripes*. BLACK DUCK.—A rare migrant.

20. *Chaulelasmus streperus*. GADWALL.—A tolerably common migrant and probably a rare breeder.

21. *Mareca americana*. BALDPATE.—Abundant during migrations and tolerably common in summer.

22. *Nettion carolinense*. GREEN-WINGED TEAL.—Abundant migrant and occasionally a rare breeder. Arrives early in April and early in September. Departs early in May and in November.

23. *Querquedula discors*. BLUE-WINGED TEAL.—An abundant migrant and summer resident. By far the most abundant duck during the summer. Breeds on all ponds and bayous of rivers. Arrives late in April and leaves in November.

24. *Querquedula cyanoptera*. CINNAMON TEAL.—Tolerably common in the spring of 1901. Ordinarily a rare bird.

25. *Spatula clypeata*. SHOVELLER.—An abundant summer resident. Arrives about April first but not conspicuously abundant until the middle of the month.

26. *Dafila acuta*. PINTAIL.—The Pintail or "spike-tail" is the earliest duck. Until late in March it is the predominant species. It is a common breeder also.

27. *Aix sponsa*. WOOD DUCK.—Only a few pairs breed along the Dakota river in this county.

28. *Marila americana*. REDHEAD.—An abundant migrant and a fairly common breeder. Arrives late in March and leaves late in October or November.

29. **Marila valisineria** CANVAS-BACK.—A common migrant and tolerably common breeder. Associated with the Redheads.
30. **Marila marila**. SCAUP DUCK.—A common migrant.
31. **Marila affinis**. LESSER SCAUP DUCK.—An abundant migrant.
32. **Marila collaris**. RING-NECKED DUCK.—A common migrant.
33. **Clangula clangula americana**. GOLDEN-EYE.—A rare migrant.
34. **Charitonetta albeola**. BUFFLE-HEAD.—A common migrant.
35. **Erismatura jamaicensis**. RUDDY DUCK.—A very common summer resident. Because of their diving ability these ducks are safe and have nests even within the corporation limits of Artesian and Letcher, upon the lakes.
36. **Chen hyperboreus hyperboreus**. SNOW GOOSE.—A very common migrant.
37. **Anser albifrons gambeli**. WHITE-FRONTED GOOSE.—An abundant migrant. Sometimes seen as late as early June.
38. **Branta canadensis canadensis**. CANADA GOOSE.—A common migrant. The first goose to appear in the spring.
39. **Branta canadensis hutchinsi**. HUTCHINS'S GOOSE.—A very common migrant. Rarely seen in the same flock with the larger subspecies.
40. **Olor columbianus**. WHISTLING SWAN.—A common migrant. During the spring of 1905 two of these birds remained on Calahan Lake from mid-April to mid-May.
41. **Botaurus lentiginosus**. BITTERN.—An abundant breeder. Arrives late in April and leaves late in September.
42. **Ixobrychus exilis**. LEAST BITTERN.—Occasional; a rare breeder.
43. **Ardea herodias herodias**. GREAT BLUE HERON.—A common migrant and a rare breeder.
44. **Butorides virescens virescens**. GREEN HERON.—Nests commonly along the river.
45. **Nycticorax nycticorax naevius**. BLACK-CROWNED NIGHT HERON.—Until 1903 a colony of about two hundred nests was maintained in an ash grove about two miles south of Forestburg. The creation of a 'park' resulted in the desertion of this site and the establishment of a heronry in a scrub oak grove about five miles down stream. The herons from this colony daily spread over a large area. They went at least 15 miles up stream and more than 12 miles east, and as far west.
46. **Grus americana**. WHOOPING CRANE.—A rare migrant.
47. **Grus mexicana**. SANDHILL CRANE.—Abundant in migrations and a tolerably common breeder. Nests found. The call of the crane is one of the most memorable of bird calls.
48. **Rallus virginianus**. VIRGINIA RAIL.—Abundant migrant and common breeder.
49. **Porzana carolina**. SORA.—An abundant breeder.
50. **Fulica americana**. COOT.—An exceedingly abundant breeder. In the fall thousands spend several weeks on Visser's Lake.
51. **Lobipes lobatus**. NORTHERN PHALAROPE.—Rare migrant, specimens taken.

52. *Steganopus tricolor*. WILSON'S PHALAROPE.—An abundant migrant and breeder.
53. *Recurvirostra americana*. AVOCET.—A rare migrant.
54. *Gallinago delicata*. WILSON'S SNIPE.—An abundant migrant.
55. *Macrorhamphus griseus scolopaceus*. LONG-BILLED DO-WITCHER.—A common migrant.
56. *Micropalama himantopus*. STILT SANDPIPER.—A tolerably common migrant. [Vermilion, May 10.]
57. *Pisobia maculata*. PECTORAL SANDPIPER.—An abundant migrant.
58. *Pisobia fuscicollis*. WHITE-RUMPED SANDPIPER.—A common migrant.
59. *Pelidna alpina sakhalina*. RED-BACKED SANDPIPER.—A tolerably common migrant.
60. *Pisobia bairdi*. BAIRD'S SANDPIPER.—A tolerably common migrant.
61. *Pisobia minutilla*. LEAST SANDPIPER.—A common migrant.
62. *Ereunetes pusillus*. SEMIPALMATED SANDPIPER.—A fairly common migrant.
63. *Limosa fedoa*. MARBLED GODWIT.—Very rare.
64. *Limosa hæmastica*. HUDSONIAN GODWIT.—I have seen only one individual, near Artesian, July 10, 1903.
65. *Totanus melanoleucus*. GREATER YELLOW-LEGS.—A very common migrant.
66. *Totanus flavipes*. YELLOW-LEGS.—An abundant migrant.
67. *Helodromas solitarius solitarius*. SOLITARY SANDPIPER.—In matter of numbers only a common migrant; but during May, July and August, one or two may be seen on almost every body of water. [Nemo, Sept. 1.]
68. *Catoptrophorus semipalmatus inornatus*. WESTERN WILLET.—A common migrant.
69. *Bartramia longicauda*. UPLAND PLOVER.—Nests abundantly throughout the county. I do not believe it is notably less common than ten years ago.
70. *Actitis macularia*. SPOTTED SANDPIPER.—An abundant migrant. This sandpiper is the one seen frequently along the river. It nests tolerably commonly. I have caught downy young.
71. *Squatarola squatarola*. BLACK-BELLIED PLOVER.—Occasionally a common migrant.
72. *Charadrius dominicus dominicus*. GOLDEN PLOVER.—Occasionally a common migrant.
73. *Oxyechus vociferus*. KILLDEER.—A very abundant summer resident. Arrives before the middle of March and departs in November.
74. *Ægialitis semipalmata*. SEMIPALMATED PLOVER.—Common migrant.
75. *Ægialitis meloda*. PIPING PLOVER.—A tolerably common migrant.

76. *Arenaria interpres morinella*. RUDDY TURNSTONE.— I saw a flock of eight of these birds May 30, 1905.

77. *Colinus virginianus virginianus*. BOB-WHITE.— A fairly abundant resident. An occasional particularly severe winter decimates their number.

78. *Tympanuchus americanus americanus*. PRAIRIE CHICKEN.— An abundant resident.

79. *Pediocetes phasianellus campestris*. PRAIRIE SHARP-TAILED GROUSE.— This grouse replaces the Prairie Chicken, in the wide, sandy stretch southwest of Forestburg. The grayish epaulettes of the young are conspicuous as they alight. Quite abundant everywhere in winter.

80. *Zenaidura macroura marginella*. WESTERN MOURNING DOVE.— An abundant summer resident. I have found nests on the ground several times. [Nemo, Aug. 14.]

81. *Cathartes aura septentrionalis*. TURKEY VULTURE.— Seen occasionally during the summer, and more frequently in September.

82. *Circus hudsonius*. MARSH HAWK.— Abundant from early March to the coming of winter.

83. *Accipiter velox*. SHARP-SHINNED HAWK.— A tolerably common migrant.

84. *Accipiter cooperi*. COOPER'S HAWK.— Rare, during migrations.

85. *Astur atricapillus atricapillus*. GOSHAWK.— Rare migrant.

86. *Buteo borealis calurus*. WESTERN RED-TAIL.— A common breeder.

87. *Buteo borealis krideri*. KRIDER'S HAWK.— A common migrant.

88. *Buteo lineatus lineatus*. RED-SHOULDERED HAWK.— A rare migrant.

89. *Buteo swainsoni*. SWAINSON'S HAWK.— Breeds abundantly. Arrives early in April and departs in October.

90. *Buteo platypterus*. BROAD-WINGED HAWK.— Seen twice during the summer. Collected near Pierre by H. E. Lee.

91. *Archibuteo lagopus sancti-johannis*.— ROUGH-LEGGED HAWK.— Common migrant and tolerably common in winter near the woods.

92. *Archibuteo ferrugineus*. FERRUGINEUS ROUGH-LEG.— Abundant migrant and common in winter. More a bird of the open than the preceding.

93. *Aquila chrysaëtos*. GOLDEN EAGLE.— Common during the winter.

94. *Haliaeetus leucocephalus leucocephalus*. BALD EAGLE.— Rare winter visitant.

95. *Falco mexicanus*. PRAIRIE FALCON.— Common except in mid-summer.

96. *Falco peregrinus anatum*. DUCK HAWK.— Occasional migrant.

97. *Falco columbarius columbarius*. PIGEON HAWK.— A tolerably common migrant.

98. *Falco sparverius sparverius*. SPARROW HAWK.— Breeds abundantly.

99. *Pandion haliaëtus carolinensis*. OSPREY.— One was clearly seen flying down the river October 15, 1905.

100. *Asio wilsonianus*. LONG-EARED OWL.— Abundant migrant and an occasional resident.

101. *Asio flammeus*. SHORT-EARED OWL.— Abundant except in the winter, when it is rare. Nests found.

102. *Otus asio asio*. SCREECH OWL.— An abundant resident. Nests found.

103. *Bubo virginianus pallescens*. WESTERN HORNED OWL.— Very common in winter.

104. *Nyctea nyctea*. SNOWY OWL.— Irregularly common in winter, especially in February.

105. *Speotyto cunicularia hypogæa*. BURROWING OWL.— An abundant summer resident. There are but few prairie dog towns in this county. Most of these owls here nest in deserted badger holes.

106. *Coccyzus americanus americanus*. YELLOW-BILLED CUCKOO.— Nests commonly, arriving about May 15 and leaving Sept. 1.

107. *Coccyzus erythrophthalmus*. BLACK-BILLED CUCKOO.— Somewhat less common than the Yellow-billed.

108. *Ceryle alcyon alcyon*. BELTED KINGFISHER.— Breeds commonly along the river. Absent only during the period of ice.

109. *Dryobates villosus villosus*. HAIRY WOODPECKER.— Common in winter, and occasionally seen in summer in woods along the river. [Menno, Aug. 21.]

110. *Dryobates pubescens medianus*. DOWNY WOODPECKER.— A common resident in the Dakota Valley. [Pierre, Dec. 10. H. E. Lee. Mouth of Cheyenne River, Aug. 26.]

111. *Sphyrapicus varius varius*. YELLOW-BELLIED SAPSUCKER.— A tolerably common migrant, during the latter half of April.

112. *Melanerpes erythrocephalus*. RED-HEADED WOODPECKER.— A common migrant and tolerably common breeder.

113. *Colaptes auratus luteus*. NORTHERN FLICKER.— An abundant resident late in March to October. Decidedly the most common woodpecker outside of the river valley.

114. *Colaptes cafer collaris*. RED-SHAFTED FLICKER.— Rare visitor. I collected one of a pair April 5, 1912.

115. *Chordeiles virginianus sennetti*. SENNETT'S NIGHTHAWK.— An abundant summer resident.

116. *Chætura pelagica*. CHIMNEY SWIFT.— Rare. Occasionally breeds.

117. *Archilochus colubris*. RUBY-THROATED HUMMINGBIRD.— Breeds where there is honeysuckle. Not seen elsewhere.

118. *Tyrannus tyrannus*. KINGBIRD.— An abundant summer resident from May 8 to September.

119. *Tyrannus verticalis*. ARKANSAS KINGBIRD.— Abundant in summer especially about the small groves and 'tree claims' of the prairies.

120. **Sayornis phœbe.** PHŒBE.—Tolerably common migrant and rare breeder.
121. **Nuttallornis borealis.** OLIVE-SIDED FLYCATCHER.—Rare migrant.
122. **Myiochanes virens.** WOOD PEWEE.—Tolerably common breeder.
123. **Empidonax traillii alnorum.** ALDER FLYCATCHER.—Breeds abundantly in the willow thickets along the streams. [Forestburg, Aug. 10, Evarts, Aug. 6.]
124. **Empidonax minimus.** LEAST FLYCATCHER.—Tolerably common summer resident. (Evarts, Aug. 7.)
125. **Otocoris alpestris praticola.** PRAIRIE HORNED LARK.—An abundant resident.
126. **Otocoris alpestris leucolæma.** DESERT HORNED LARK.—Abundant in hard winters. (Mr. Oberholser identified one specimen, collected in February in Hutchinson county, as *O. a. enthymia*.)
127. **Pica pica hudsonia.** MAGPIE.—Common along the river in winter.
128. **Cyanocitta cristata cristata.** BLUE JAY.—Abundant except in winter. Occasionally winters.
129. **Corvus corax sinuatus.** RAVEN.—Tolerably common during the fall of 1906.
130. **Corvus brachyrhynchos brachyrhynchos.** CROW.—Abundant resident.
131. **Dolichonyx oryzivorus.** BOBOLINK.—An abundant summer resident, May 5 to Sept. 1, though rare after Aug. 1.
132. **Molothrus ater ater.** COWBIRD.—Abundant from April to September.
133. **Xanthocephalus xanthocephalus.** YELLOW-HEADED BLACK-BIRD.—Numerous in the marshes which have cat-tails and reeds.
134. **Agelaius phœniceus fortis.** THICK-BILLED RED-WING.—Breeds abundantly in marshes and in willows at water's edge. Arrives about the middle of March and leaves late in November. (Mr. Oberholser labeled my midsummer specimens as *A. p. arctolegus*. Forestburg, Aug. 10.)
135. **Sturnella neglecta.** WESTERN MEADOWLARK.—One of the most abundant of prairie birds from mid-April to November. Occasionally an individual winters.
136. **Icterus spurius.** ORCHARD ORIOLE.—Abundant in the summer, especially in the willow groves along the river. May 1 to July 31.
137. **Icterus galbula.** BALTIMORE ORIOLE.—A common summer resident especially in the town of Woonsocket.
138. **Icterus bullocki.** BULLOCK'S ORIOLE.—An occasional fall migrant. [Menno, Aug. 24.]
139. **Euphagus cyanocephalus.** BREWER'S BLACKBIRD.—A common migrant March and April, October and November. [Vermilion, April.]

140. *Quiscalus quiscula æneus*. BRONZED GRACKLE.— Abundant from March 15 to October.

141. *Herperiphona vespertina vespertina*. EVENING GROSBEAK.— Rare winter visitant.

142. *Loxia curvirostra minor*. CROSSBILL.— Rare migrant.

143. *Acanthis linaria linaria*. REDPOLL.— Common during the winter months about the groves.

144. *Astragalinus tristis tristis*. GOLDFINCH.— Abundant during the summer, May 1, — October. Occasionally winters.

145. *Spinus pinus*. PINE SISKIN.— Tolerably common migrant, and occasionally common in winter.

146. *Plectrophenax nivalis nivalis*. SNOW BUNTING.— Abundant some winters, but rare others.

147. *Calcarius lapponicus lapponicus*. LAPLAND LONGSPUR.— Abundant from September to April.

148. *Calcarius ornatus*. CHESTNUT-COLLARED LONGSPUR.— Abundant from late March to October. Nests found.

149. *Rhynchophanes mccowni*. MCCOWN'S LONGSPUR.— A tolerably common migrant and seemingly a rare breeder.

150. *Poecetes gramineus confinis*. WESTERN VESPER SPARROW.— An abundant breeder, April to September. [Forestburg, July 15.]

151. *Passerculus sandwichensis savanna*. SAVANNAH SPARROW.— A tolerably common breeder. Abundant in migrations, late in April and mid-September. [Vermilion, May.]

152. *Passerculus sandwichensis alaudinus*. WESTERN SAVANNAH SPARROW.— A rare migrant. [Menno, April.]

153. *Ammodramus savannarum bimaculatus*. WESTERN GRASSHOPPER SPARROW.— Abundant from late April till early September. [Menno, Aug. 15.]

154. *Passerherbulus henslowi occidentalis*. WESTERN HENSLOW'S SPARROW.— A tolerably frequent migrant.

155. *Passerherbulus lecontei*. LECONTE'S SPARROW.— Tolerably common migrant; a rare breeder.

156. *Chondestes grammacus grammacus*. LARK SPARROW.— Nests rather commonly in dying tree claims.

157. *Zonotrichia querula*. HARRIS'S SPARROW.— An abundant migrant.

158. *Zonotrichia leucophrys leucophrys*. WHITE-CROWNED SPARROW.— A common migrant.

154. *Zonotrichia albicollis*. WHITE-THROATED SPARROW.— A very common migrant.

160. *Spizella monticola ochracea*. WESTERN TREE SPARROW.— The most abundant sparrow of the thickets from November to April. [Menno, Dec. 27.]

161. *Spizella passerina passerina*. CHIPPING SPARROW.— Nests not infrequently.

162. **Spizella pallida.** CLAY-COLORED SPARROW.—Plentiful in migrations. Frequently nests.
163. **Spizella pusilla arenacea.** WESTERN FIELD SPARROW.—Nests commonly in the roughest areas. [Vermilion, June.]
164. **Junco hyemalis hyemalis.** SLATE-COLORED JUNCO.—Plentiful in migrations. Occasionally present almost, if not quite, all winter.
165. **Melospiza melodia melodia.** SONG SPARROW.—Abundant migrant. Plentiful in summer along the wooded streams.
166. **Melospiza lincolni lincolni.** LINCOLN'S SPARROW.—Regular migrant.
167. **Melospiza georgiana.** SWAMP SPARROW.—Rare in the summer, frequent in migrations.
168. **Passerella iliaca iliaca.** FOX SPARROW.—Irregular migrant.
169. **Pipilo erythrophthalmus erythrophthalmus.** TOWHEE.—Nests commonly.
170. **Pipilo maculatus arcticus.** ARCTIC TOWHEE.—Plentiful in migrations.
171. **Zamelodia ludoviciana.** ROSE-BREASTED GROSEBEAK.—Abundant in groves from early May to early September. [Menno, June 10.]
172. **Passerina cyanea.** INDIGO BUNTING.—An uncommon summer visitor.
173. **Passerina amoena.** LAZULI BUNTING.—An occasional or accidental visitor. One certainly seen along the river in May, 1905.
174. **Spiza americana.** DICKCISSEL.—Very abundant during June and July.
175. **Calamospiza melanocorys.** LARK BUNTING.—This species was a plentiful summer resident of this county during the dry years of the nineties. Since 1900 they have bred but infrequently here.
176. **Piranga erythromelas.** SCARLET TANAGER.—A rare May and June visitor.
177. **Progne subis subis.** PURPLE MARTIN.—Plentiful in summer, about the towns.
178. **Petrochelidon lunifrons lunifrons.** CLIFF SWALLOW.—Nests in colonies under the eaves of barns. Locally abundant.
179. **Hirundo erythrogastra.** BARN SWALLOW.—This is the best known swallow as it nests in all barns.
180. **Iridoprocne bicolor.** TREE SWALLOW.—An abundant migrant and a rare breeder.
181. **Riparia riparia.** BANK SWALLOW.—Breeds in large colonies along the river.
183. **Stelgidopteryx serripennis.** ROUGH-WINGED SWALLOW.—Breeds in small colonies in cut banks along roads and streams, quite frequent.
183. **Bombycilla garrula.** BOHEMIAN WAXWING.—Irregular during autumn, winter and spring.
184. **Bombycilla cedorum.** CEDAR WAXWING.—Uncommon migrant; occasionally seen all summer.

185. *Lanius borealis*. NORTHERN SHRIKE.—Common in winter.
186. *Lanius ludovicianus excubitorides*. WHITE-RUMPED SHRIKE.
—Breeds in most tree claims. [Forestburg, Aug. 15.]
187. *Vireosylva olivacea*. RED-EYED VIREO.—A common migrant.
[Cheyenne Agency, Aug. 12.]
188. *Vireosylva gilva gilva*. WARBLING VIREO.—To be found in
many groves in summer.
189. *Mniotilta varia*. BLACK AND WHITE WARBLER.—A very com-
mon migrant.
190. *Vermivora celata celata*. ORANGE-CROWNED WARBLER.—A
rare migrant. [Menno, April].
191. *Vermivora peregrina*. TENNESSEE WARBLER.—A rare mi-
grant. [Menno, May?]
192. *Dendroica aestiva aestiva*. YELLOW WARBLER.—Found abun-
dantly everywhere about groves.
193. *Dendroica caerulescens caerulescens*. BLACK-THROATED BLUE
WARBLER.—A fairly common migrant.
194. *Dendroica coronata*. MYRTLE WARBLER.—An abundant mi-
grant.
195. *Dendroica magnolia*. MAGNOLIA WARBLER.—A common mi-
grant.
196. *Dendroica pensylvanica*. CHESTNUT-SIDED WARBLER.—An
uncommon migrant.
197. *Dendroica castanea*. BAY-BREASTED WARBLER.—A rare mi-
grant. [Menno, May?]
198. *Dendroica striata*. BLACK-POLL WARBLER.—An abundant
migrant. [Menno, May?]
199. *Dendroica virens*. BLACK-THROATED GREEN WARBLER.—An
uncommon migrant.
200. *Dendroica palmarum palmarum*. PALM WARBLER.—A
common migrant.
201. *Seiurus aurocapillus*. OVEN-BIRD.—A regular migrant.
202. *Seiurus noveboracensis notabilis*. GRINNELL'S WATER-
THRUSH.—Common in spring and fall along the streams. Seen once in
July. [Menno, May.]
203. *Oporornis philadelphia*. MOURNING WARBLER.—A rare mi-
grant.
204. *Geothlypis trichas occidentalis*. WESTERN YELLOW-THROAT.
—The 'witchitee-bird' nests in thickets about water quite generally,
in this area. Mr. Oberholser labelled two specimens as *G. t. brachidactyla*.
[Menno, June 10, Aug. 30.]
205. *Icteria virens virens*. YELLOW-BREASTED CHAT.—An uncom-
mon visitor. Breeds rarely.
206. *Wilsonia pusilla pusilla*. WILSON'S WARBLER.—A common
migrant.
207. *Setophaga ruticilla*. REDSTART.—Abundant migrant and rare
breeder.

208. *Anthus rubescens*. PIPIT.— A common migrant.
209. *Anthus spraguei*. SPRAGUE'S PIPIT.— This bird is always seen and heard in migrations, especially common during the autumn.
210. *Dumetella carolinensis*. CATBIRD.— An abundant breeder in all thickets.
211. *Toxostoma rufum*. BROWN THRASHER.— Plentiful in summer.
212. *Troglodytes ædon parkmani*. WESTERN HOUSE WREN.— Breeds abundantly along the rivers and about the towns. [Menno, Aug. 24.]
213. *Nannus hiemalis hiemalis*. WINTER WREN.— A rare migrant. [Menno, April 14.]
214. *Cistothorus stellaris*. SHORT-BILLED MARSH WREN.— Several nests found; quite common.
215. *Telmatodytes palustris iliacus*. PRAIRIE MARSH WREN.— Rare migrant and occasional breeder.
216. *Certhia familiaris americana*. BROWN CREEPER.— A common migrant. Rare in winter.
217. *Sitta carolinensis carolinensis*. WHITE-BREASTED NUTHATCH.— A tolerably common migrant. [Menno, February 15.]
218. *Sitta canadensis*. RED-BREASTED NUTHATCH.— A rare migrant.
219. *Penthestes atricapillus septentrionalis*. LONG-TAILED CHICKADEE.— Common except in mid-summer. Nests rarely. [Menno, September 2.]
220. *Regulus satrapa satrapa*. GOLDEN-CROWNED KINGLET.— A tolerably common migrant.
221. *Regulus calendula calendula*. RUBY-CROWNED KINGLET.— A common migrant.
222. *Hylocichla mustelina*. WOOD THRUSH.— A fairly common migrant. Breeds occasionally.
223. *Hylocichla fuscescens salicicola*. WILLOW THRUSH.— Common in migrations.
224. *Hylocichla aliciae aliciae*. GRAY-CHEEKED THRUSH.— A common migrant.
225. *Hylocichla ustulata swainsoni*. OLIVE-BACKED THRUSH.— A common migrant.
226. *Hylocichla guttata pallasi*. HERMIT THRUSH.— A rare or accidental migrant.
227. *Planesticus migratorius migratorius*. ROBIN.— Breeds abundantly in the towns. Rare elsewhere.
228. *Sialia sialis sialis*. BLUEBIRD.— Nests irregularly. Sometimes common in migrations.

BIRDS NEW OR RARE TO THE FAUNA OF MAINE.

BY ARTHUR H. NORTON.

THE following records which have come under my observation during the past few years represent additions to the avifauna of Maine or additional occurrences of species rarely found in the state.

***Xema sabini*.** SABINE'S GULL.—On September 11, 1912, Mr. Everett Smith and I saw one of these birds near Bluff Island, Saco Bay, Me. It came in from the eastward with a few terns attracted by fish livers which we were throwing out, but it did not come quite within gunshot. Its slaty mantle, small size, and black edged wing were carefully noted. Its flight resembled that of the terns, but its manner of feeding that of Bonaparte's Gull. Mr. Smith secured a specimen near this spot May 31, 1877.¹

The only other Maine record seems to be one near the Brothers Islands, Casco Bay, September 22, 1899.²

***Sterna dougalli*.** ROSEATE TERN.—Since there are but few records of this tern for Maine and none of these are recent, it seems suitable to publish this occurrence. While Mr. Everett Smith and I were near Bluff Island, Saco Bay, August 19, 1912, Mr. Smith secured an adult specimen of this bird, which he presented to the collection of the Portland Society of Natural History. The other records are as follows:

A small flock was seen upon the Green Islands in Casco Bay on the 20th of July [prior to 1879].³

A few once bred on a small island near Tenants Harbor, St. George, and at the Isles of Shoals.⁴

The two following reports are in print. "A few seen, Fox Island, August 6 [and] 12 [18] 99, identification not absolute"⁵ and "Three seen on August 31, 1900 [near Isleboro] by G. C. Shattuck."⁶

***Mareca penelope*.** EUROPEAN WIDGEON.—Mr. E. B. Pillsbury brought me a female of this bird, in the flesh which was taken at Scarborough November 13, 1912, the first of the kind to be detected in the state.

There is another specimen in the state museum at Augusta taken at Swan Island, Merrymeeting Bay, September 20, 1911. I am obliged to

¹ 1883, Smith, Forest & Stream, XX: 205.

² 1900, Knight, Journ. Me. Orn. Soc., II: 2.

³ 1879, Brewster, Bull. Nutt. Orn. Cl. IV: 15.

⁴ 1884, Brewer, Hist. N. Am. Bds., Water Bds., II: 305.

⁵ 1900, Howe, Journ. Me. Orn. Soc., II: 28.

⁶ 1901, Howe, Journ. Me. Orn. Soc., III: 14.

Mr. Thomas James, curator of the state museum, both for the privilege of making a careful examination of the specimen and for permission to record it. Additional specimens are to be expected.

Clangula islandica. BARROW'S GOLDEN-EYE.—Barrow's Golden-Eye is well known to occur regularly on the Maine coast westward to upper Penobscot Bay. West of this region there have been no records for the state. It is with considerable interest then that the following records of its occurrence at Scarborough, are presented.

Among the heads of a number of Ducks brought me for the preparation of skulls, were a young male and a female of this species. Mr. E. B. Pillsbury who secured the birds was certain that they were taken either December 30, or December 31, 1911, but the two were not in each others company. Mr. Pillsbury very kindly offered to aid me in looking for more and in the attempt to secure specimens, with the result that we secured two females Jan. 11, a superb adult male March 26, and an immature male March 28, 1912.

Chen hyperborea hyperborea. SNOW GOOSE.—Through an oversight, which has passed unchallenged, in recording a specimen of this bird taken in Gorham, Maine, in November, 1908,¹ the technical name of the next subspecies was used together with the common name of the present form, rendering the record void.

As the original records of Snow Geese in Maine are scattered, if not somewhat obscured, the following summary is presented:

C. hyperborea hyperborea.—One near Portland, December, 1880.²

A male, Toddy Lake, Hancock Co., October, 4, 1893 and a male Lake Umbagog, October 2, 1896.³

One at Pushaw [Pond] and one at Nicatous. [Prior to 1897].⁴

Two were taken near Merrymeeting Bay, one October 10, the other a short time later in 1897.⁵

Of this total of eight specimens which have been identified, all have been autumnal, occurring singly or in pairs.

The following fall records, and reports of Snow Geese not identified, are presented under this subspecies.

One at Glenburn, October 18, 1881, and one near Hallowell, November 25, 1881.⁶

The late Alphaeus G. Rogers of Portland gave me information of one seen by him at Cape Elizabeth, October 9, 1911.

Chen hyperborea nivalis. GREATER SNOW GOOSE.—On April 4, 1913, a flock of upwards of thirty Snow Geese were seen at Pine Point. Scarborough by Mr. I. W. Pillsbury, and others. They alighted and

¹ 1909, Norton, Auk, XXVI: 304.

² 1882, Brown, Abstr. Proc. Portland Soc. N. H., II: 2.

³ 1897, Brewster, Auk, XIV: 207.

⁴ 1897, Knight, fide Hardy. Bull. 3, Univ. of Me., 36.

⁵ 1898, Knight, fide Day. Maine Sportsman, Sept. 1898, p. 14.

⁶ 1883, Smith, Forest & Str., XX: 125.

though frightened several times, remained in the vicinity a few hours and finally passed to the eastward. The following day several smaller flocks were reported in different parts of Casco Bay. From one of these flocks four birds were shot, at Great Chebague Island. After considerable effort I succeeded in securing one of the heads (all of the available remains) and it proved to be of this form.

The previous records are:

One, Heron Island, Phippsburg, April 7, 1890.¹

One, Back River, Georgetown, April 25, 1903.²

One, Lubec, April 30, 1906.³

Since all spring specimens so far identified (totaling four) have been of this form the following spring records and reports of Snow Geese are arranged here.

A flock of about two hundred on the ice of Long Pond between Bridgton and Harrison, April 13, 1908, and similar flock on Sebago Lake the following day.⁴

There is also a published report of "A flock" which "remained undisturbed half a day" on Nonesuch River, Scarborough"⁵ [prior to 1883], but without mention of season or date.

Macrorhamphus griseus scolopaceus. LONG-BILLED DOWITCHER.—Though long anticipated,⁶ and probably of casual occurrence, material for the first positive record of the Long-billed Dowitcher, comes to hand in a specimen in fresh winter plumage taken at Scarborough in the first half of October, 1912, by Mr. John Peterson. Mr. Peterson had the specimen mounted, and presented it to the museum of the Portland Society of Natural History.

Machetes pugnax. RUFF.—On October 16, 1912, a female of this species was shot on the Nonesuch River, Scarborough, by Mr. I. W. Pillsbury from whom it came into my possession. This is but a short distance from the spot where Mr. Everett Smith, shot the first Maine specimen in 1870.⁷ In both instances the birds were alone, the last one came in from the sea, and alighted. This supplies material for the fourth record for the state, the others being:

The Smith specimen referred to April 10, 1870.⁸

A female taken at Upton, Me., September 8, 1874,⁹ (the second specimen, but first to be published.)

A specimen is recorded as taken at Camden, Maine, September 14, 1900.¹⁰

¹ 1890, Batchelder, Auk VII: 284.

² 1904, Spinney, Journ. Me. Orn. Soc., VI: 69.

³ 1906, Clark, Journ. Me. Orn. Soc., VIII: 48.

⁴ 1908, Mead, Journ. Me. Orn. Soc., X: 59.

⁵ 1883, Smith, Forest & Str., XX: 125.

⁶ 1882, Brown, Proc. Port. Soc. N. H., II: 26.

⁷ 1883, Smith, Forest & Str., XX: 85.

⁸ l. c.

⁹ 1876, Brewster, Bull. Nutt. Orn. Cl., I: 19.

¹⁰ 1905, Thayer, Auk, XXII: 409.

GENERAL NOTES.

The Red-throated Loon (*Gavia stellata*) at the Southern Extremity of Lake Michigan.— March 24, 1913 I found an immature female of this species lying dead on the beach at Miller, Lake Co., Indiana. Evidently some hunter had shot it and then thrown it away. It was in excellent condition, being very fat, and had been, to all appearances, recently killed. It may be, as Mr. B. F. Gault suggests, that this species is more common on Lake Michigan during the colder months than is generally supposed, but printed records, for the region about Chicago at least, are few. Therefore, it seems worth while to put this specimen on record. I have preserved the skin.

Mr. Gault has very kindly given me permission to publish another record concerning the appearance of this species in the Chicago area. April 18, 1908, he found a specimen in adult plumage in the shop of a taxidermist at Lyons. This bird was said to have been shot that morning nearby in the Desplaines River below Riverside, a western suburb of Chicago.

I wish to express my obligations to Messrs. A. W. Butler and B. T. Gault for information concerning previous records.—EDWIN D. HULL, *Chicago, Ill.*

The Old-squaw (*Harelda hyemalis*) on the Connecticut Coast in Summer.— Since there seem to be but few published notes concerning the occurrence of the Old-squaw south of its breeding grounds in summer, the following notes will probably be of interest. I first observed this species in summer on August 2, 1906, in a small bay at the mouth of Oyster River, West Haven, Conn. There were three of the birds at this time. They were observed very closely and seemed disinclined, and perhaps unable to fly. When I threw stones close to them they paid no attention, and when I ran at them suddenly, to try to make them fly, they merely dove.

My second meeting with this species in summer occurred recently at Compo, Conn., near Westport. On the evening of July 14, 1913, I was out rowing with three friends. It was a warm, moonlight, summer evening without a breath of wind. When nearly a mile from shore we heard the calling of a flock of Old-squaws. As we drew nearer they called repeatedly, and we soon saw them, seated on the water. It was too dark to see any but the nearest birds, so that an accurate count was impossible. The most that I counted at one time was twelve, but I believe it more likely that the number was somewhere between fifteen and twenty. When we got close to them, some of the birds flew, but most of them beat along the surface of the water with their wings as if unable to rise, and finally dove instead. The birds called repeatedly, the "south south southerly" call. Although we were unable to see them clearly enough in the moonlight to make out

anything, except that they were ducks, this call is so characteristic and unmistakable that the identification from it alone is certain.—ARETAS A. SAUNDERS, *Mt. Vernon, N. Y.*

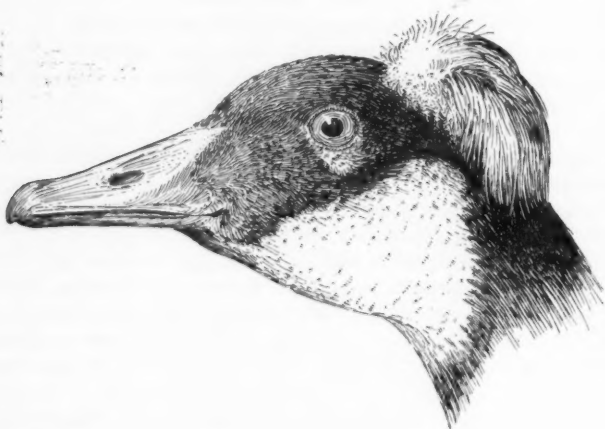
A Crested Canada Goose.—On February 15, 1913, three Canada Geese, all with a peculiar crest of feathers were shot from the same bunch of geese, near Pea Island, N. C.

Dr. H. B. Bigelow came into possession of the partial scalp of one of these curious birds and was good enough to turn it over to me.

From this piece of head skin I have had the accompanying drawing made. The crest is dirty brownish in color and the feathers are stiff and rather tightly curled.

The occurrence of this crest in a race of wild geese is interesting, because the crested Polish fowls and the breed of crested ducks are well known.

So far as I am informed there is no race of crested geese, though in Wright's Book of Poultry, 1886, p. 562, there is mention of the fact that in



crosses between Embden and Toulouse geese the majority of the gander and a fair proportion of the geese carry a slightly crested head.

Davenport showed (Carnegie Institute Pub. no. 52) that the crest of the Polish fowl was a dominant character, though the dominance was not perfect. The crest here is associated with a cerebral hernia.

The fact that three crested individuals were shot from this same flock of geese means that they belonged almost certainly to the same family, and that the crest was probably inherited as a dominant character.

If such a variation had occurred in captivity it could have been made the basis for a permanent race of crested Canada Geese.—JOHN C. PHILLIPS, *Wenham, Mass.*

Greater Snow Goose (*Chen hyperboreus nivalis*) in Arkansas.—On March 28, 1913, a farmer living three miles west of this city shot an adult male Greater Snow Goose in his field. The bird was seen feeding all day but no others of its species were observed near. I examined it carefully in the flesh and found it to be in perfect plumage. Dr. C. H. Luther of this city, who made it up into a skin, informed me that the specimen was in good condition and that he found only fresh wounds on the body.—ALBERT LANO, Fayetteville, Arkansas.

Feeding Wild Ducks on Sodus Bay, N. Y.—Sodus Bay, one of the largest bays on the southern shore of Lake Ontario, was the scene of an interesting experiment in the feeding of wild ducks during the months of February and March, 1913. The bay, which is a large irregularly shaped body of water, containing several islands, is frequented in the spring and fall by large numbers of ducks. The winter was unusually mild up to the first of February, and many ducks remained on a large area of the bay which was open, and where they apparently found plenty of food. About February 1 the weather turned suddenly cold, with heavy snow storms and high winds. This caused the bay to freeze entirely over, preventing the ducks from reaching their feeding grounds. On February 4 the weather was very stormy, and several thousand ducks were noted in places still remaining open. On February 5 Mr. Claude T. DeVillie, the state game protector at Sodus Point, noted that the ducks were flying to places kept open by men harvesting ice. The ducks were very fearless and were apparently suffering from lack of food. On the succeeding day, February 6, he obtained a quantity of wheat, and tried feeding the ducks. The grain was readily eaten and he immediately wrote the New York State Conservation Commission, notifying them of the presence of the ducks and the necessity of relief measures. The Commission promptly responded, and on February 10, Mr. DeVillie received word to purchase grain and feed the ducks. He first tried feeding by throwing the grain in the water, but the ducks were so weak that they apparently had difficulty in reaching bottom in sixteen feet of water. This fact alone shows the extremes to which the ducks were reduced, as they were mainly Bluebills, Redheads and Canvasbacks, all of which feed at considerable depths. He then tried placing the grain on the ice on a place scraped clear of snow near the edge of the open water. This proved successful, as the ducks immediately came out on the ice, feeding like barnyard fowls. At one place near where men employed by the Northern Central Railway Co. were harvesting ice, there were often six or seven hundred ducks feeding at one time. The ducks were fed in this manner at all the places which remained open, which varied from three or four to six or eight. They were fed at least once and often twice each day, and during the period from February 10 to March 10, when the feeding was discontinued, thirty-eight bushels of wheat were fed.

The ducks soon learned to look for the grain and upon seeing Mr. DeVillie starting out on the ice, would fly to the places where the grain was placed.

At one time all the holes had frozen over, and the grain was placed on the bare ice, the ducks coming in from the lake and lighting on the ice to feed. This was at a distance of about a quarter of a mile from the open water in the lake. On February 21, being temporarily out of wheat, cracked corn was tried, but the ducks apparently did not relish it, and did not clean it up, as they did the wheat. During a period from February 12 to 16, Mr. DeVille estimated the number of ducks was at least ten thousand. They gradually scattered with the coming of milder weather, but there were several thousand still present on March 18.

The ducks were about seventy-five per cent Bluebills, or Scaups, the remainder being about evenly divided between Canvasbacks and Redheads, with a few Whistlers.

On March 13 when the writer visited the bay he counted in an open place between the outlet of the bay and Sand Point, about five hundred Bluebills, one hundred Redheads, a few Canvasbacks, about a dozen Mallard, three or four Black Ducks and several Holboell's and Horned Grebes. At this time the ducks were apparently able to take care of themselves, were feeding in the usual manner, and did not come for the grain.

Mr. DeVille stated that the ducks were in such poor condition, that he had seen many with ice frozen to their feathers, the wing feathers being sometimes frozen together. Many also had balls of ice over the bill, often extending to the eyes. Fourteen ducks were found dead, eleven Bluebills, one Canvasback and two Redheads. One Bluebill drake found in full plumage weighed one pound and three ounces.

Great credit must be given to both Mr. DeVille, who is a game protector of a type we need more of, and the New York State Conservation Commission, for their prompt action in this matter, for there is no doubt that if they had not acted in time, thousands of ducks would have died of starvation.—H. E. GORDON, *Rochester, N. Y.*

Early Occurrence of Rails in Massachusetts.—On August 26, 1913, a Yellow Rail (*Coturnicops noveboracensis*) was taken in Longmeadow near Springfield, Mass., and on the 22d. of the same month, a King Rail, *Rallus elegans*, was captured in the same town.

These are the earliest autumnal dates recorded for the appearance of either of these species of birds in this part of the Connecticut Valley, although I believe that both kinds are more often represented here than is generally supposed, and it is possible that they breed here.

In Massachusetts, under a very unwise state statute purporting to be for the protection of certain kinds of so-called marsh birds, the open season for Rallidae begins as early as August 1, and on that day in Longmeadow, a sportsman caught a young Virginia Rail that was still in the downy state, and probably not more than ten days old.—ROBERT O. MORRIS, *Springfield, Mass.*

Woodcock in Ohio Co., West Virginia.—The first authentic record of the occurrence of the Woodcock (*Philohela minor*) in Ohio County, West

Virginia, came under my notice on July 20, 1913. The writer has been a student of the bird life of this county for the past twenty years, yet this is the first time in his experience that he has been able to positively identify this game bird in this locality.

While sitting on the porch of our residence at Park View in company with his wife the writer was attracted by the peculiar fluttering of a bird which alighted upon the lawn about thirty feet distant. This characteristic and familiar flight recalled instantly to mind this bird which he had formerly often seen in the swampy land about Ithaca, N. Y., but never before here. The bird had hardly alighted before its long bill and large black eyes proclaimed it *Philohela minor*, but an exclamation of surprise from one of us caused it to fly again about ten feet farther away. The writer then followed the stranger behind the shrubbery until it flew into the garden in the rear of the house, where we both under cover of a friendly bush from a distance of only ten feet, calmly watched the owner of those large eyes bore in the damp ground of the potato patch for worms. The protective coloration did not hide it from view at such close range as it was but 8 o'clock in the evening and quite light. After watching the visitor for ten minutes we left him peacefully to pursue his way.—ROBERT B. McLAIN, *Wheeling, W. Va.*

Eskimo Curlew (*Numenius borealis*) in Massachusetts.—On September 5, 1913, an Eskimo Curlew was taken on the marsh at East Orleans, Mass., by Mr. John Greenough Rogers.

The bird was alone and when taken the weather was thick and raining with an east wind, and since the afternoon of the day before the wind had been northeast to east with rain most of the time.

After the bird was shot, what appeared like hardened whitish grease formed at the nostrils. The centre feathers of the under tail-coverts and the under sides of the ends of the tail feathers were stained a purple color. There was nothing in the stomach but the bird was very fat.

The specimen was preserved and is now in my collection.—CHARLES R. LAMB, *Cambridge, Mass.*

The Golden Plover (*Charadrius dominicus dominicus*) in Michigan in Spring.—In "Michigan Bird Life," 1912, 210, Prof. Barrows mentions that "although several observers have reported it as seen in spring I have not been able to find a spring specimen in any collection in the state, and it seems likely that these reports may be incorrect." There is a skin in the Museum of Zoölogy, University of Michigan, that was secured on April 20, 1890, by Mr. Norman A. Wood near Pittsfield, one mile north of Saline, Washenau County. There were a flock of some thirty birds feeding in a wet meadow and five were secured from this flock. Two specimens were mounted for some Chicago man, name now forgotten; these were nearly all black on the underparts. The specimen in the Museum collection is in a very advanced plumage.—B. H. SWALES, *Mus. of Zoölogy, Univ. of Michigan, Ann Arbor, Mich.*

Introduction of the Ruffed Grouse on Washington Island, Wis.—

While visiting Washington Island, Wisconsin, in July, 1913, I learned that Ruffed Grouse had been introduced and had apparently become successfully established. As cases of the successful introduction of this bird are rare it may be of interest to place on record such facts as I was able to obtain. Washington Island, situated in Door County at the entrance of Green Bay, has an area of about 15,000 acres and is largely covered with deciduous trees and some spruce, hemlock and arborvitæ. Its present population is about 1200. A strait known as Death's Door, some five miles in width, separates the island from the peninsula on the east side of Green Bay. So far as known, the Ruffed Grouse was not formerly found on the island. In 1900 Mr. Wm. Barnhart of Sturgeon Bay, deputy warden of Door and Kewaunee counties, having undertaken to introduce the species from the main land, advertised for live 'partridges' and secured several specimens. In September a female which had been captured in a house was brought to him, and a month later a male caught in a granary and a female caught in an enclosure of chicken wire, were secured. These birds were all liberated on the south side of the island near the post office at Detroit Harbor. During the following year similar efforts resulted in the acquisition of two more birds, a male and a female, which were liberated at the same place. These birds were kept in captivity only two or three days and were fed on mountain ash berries or thorn apples. Recently Ruffed Grouse have been reported at various points on the island even on the north shore, and last year fifteen were seen at one place, indicating that the species had bred and was increasing in numbers.—T. S. PALMER, *Washington, D. C.*

Actions of Nesting Red-shouldered Hawks.—The Red-shoulder has endured persecution here in Wells County, Indiana, better than the Red-tail which has almost disappeared, and every year I am able to locate a few nests. To take the eggs and cause the birds to nest a second time when leaves are on the trees and nests less readily discovered gives the birds and their offspring a better chance of escaping the constant warfare waged on them. Birds once robbed of their eggs are more wary and have a better chance of escaping the guns of irate chicken owners.

On April 6 I climbed to a nest forty-six feet high in a beech. One of the parents remained in the top of the tree calling fiercely but not moving. No attention was paid to it or to the other parent which was not noticed at the time. Just as I stood up on tiptoes to look in the nest this other parent gave me a hard blow on the side of my head, fortunately striking the heavy felt hat I wore in which three sharp cuts about half an inch long were made. My scalp was slightly cut by the unexpected attack, which resulted in a decided headache. Being thus put on my guard, I watched this parent, which soon returned to the attack, flying from the top of a tall tree about one hundred and fifty feet from me, straight at my head. I struck at it, but missed and the bird swerved, missing my face by about a foot. A third similar attack was made, but in this case the bird missed me by about three

feet. All this time the other parent remained possibly fifteen feet directly over me, calling shrilly. In discovering this nest, as I entered the woods, I saw one parent sitting about twenty feet from the nest. The other bird left the nest when I rapped the tree with a small club. I did not climb at once, but walked on through the woods, both birds following, approaching closely, and calling frequently.

Later on in the day in another woods I saw a nest at some distance. As I approached, when possibly two hundred feet away, the parent slipped from the nest and flew silently and swiftly away. While climbing to this nest neither parent bird was seen or heard. After I returned to the ground they returned flying at a distance, at a great height and calling frequently.

The behavior of these birds was in striking contrast to that of the first pair, and it was the owners of the fresh eggs which were more aggressive.

The owners of five other nests found later showed none of the aggressiveness exhibited by the first pair usually remaining at quite a distance.

The aggressive pair built again and April 29 had a nest in a beech, one hundred feet from the former site. One parent left the nest as I approached and the other flew away when I was possibly fifty feet from the tree. The former bird remained near and several times flew within a few feet of me with angry cries but did not attack me.—E. B. WILLIAMSON, *Bluffton, Indiana*.

Metallura vs. Laticauda.—In 'The Auk' for January, 1902, page 92, Dr. Charles W. Richmond proposed to replace *Metallura* Gould 1847, by the earlier name *Laticauda* Lesson 1843, and the latter has been adopted in the recently published 'Birds of South America' by Brabourne and Chubb (Vol. I, page 137).

Fortunately, however, this change is unnecessary as there is an earlier *Laticauda* published by Laurenti in 1768 for a genus of serpents. Dr. Stejneger writes me that this is a perfectly valid name, diagnosed and with species. The genus of South American Hummingbirds will therefore retain its long established name, *Metallura*.—W. DEW. MILLER, *American Museum of Natural History, New York City*.

Hummingbirds' Eyelashes.—An interesting fact was brought to light while my friend Mr. H. Muller Pierce was examining some Hummingbirds in my collection. We were using a powerful magnifying glass and looking at the brilliant metallic feathers on the throat, and the difference in the shade of colors, as they appeared with and without the glass. Mr. Pierce remarked "look at the eye lashes on this one!" With the naked eye we could see only the tiny black rim of the eyelid about the size of a pin head, but with the glass we found both upper and lower lids adorned with a row of minute round feathers set at regular intervals, about twenty in all. Upon further examination of over one hundred species from North, Central and South America, we found these feathers were of two colors—the majority being black, the others pale grayish brown. One exception

was found, *Gouldia conversi* from Costa Rica, in which the eyelid feathers are metallic green. Of our North American Trochilidae, *Eugenes fulgens*, *Archilochus colubris*, *Calypte costae*, *Basilinna zantusi* and *Cyanthus latirostris*, have black eye lashes, while in *Calypte anna*, *Selasphorus platycercus*, *S. rufus*, and *S. alleni*, *Stellula calliope*, *Amizilis tzacall* and *A. cerviniventris chalconota*, they are brownish gray. The fact that the color of the eyelid feathers is alike in the male and female, may prove valuable in identifying certain species when other points fail; and the characters may be of value in the case of other small birds such as warblers, vireos, titmice, flycatchers, wrens, etc.—HENRY K. COALE, *Highland Park, Ill.*

The Great-tailed Grackle in New Mexico.—This note constitutes the first record of the occurrence of the Great-tailed Grackle (*Megascopus major macrourus*) within New Mexico, as far as I can determine by examination of previous records.

One adult male specimen was brought in by Miss Fannie Ford of Las Cruces, New Mexico, on May 15, 1913. It was shot at her home, having been mistaken for a crow while flying about the corral. The measurements for this specimen come very near the minimum for this species. A pair of these birds is reported nesting at La Mesa, N. M., ten miles south of this place. The nest is placed in a large apricot tree in a dooryard. The birds are not at all shy but characteristically noisy! Their nesting is to be unmolested and it will be interesting to note if this is the beginning of a permanent residence or annual summer visitations to this place, or if it is merely a sporadic occurrence. It would seem that the conspicuousness of the species would have made record of it an easy matter had it occurred in this region to any extent previously.—D. E. MERRILL, *State College, N. M.*

The Night Song of Nuttall's Sparrow.—W. R. Lord, in his 'Birds of Oregon and Washington,' says of Nuttall's Sparrow, that, "Often, through the darkest nights, in the Virginia creeper or honeysuckle around the porch or piazza, he utters his plaintive song — seeming to say, as one sensitive observer has imagined it: 'Sweet, Sweet, listen to me, won't you.'"

I first noticed this peculiar habit on the night of April 16 when one sang at 10:15 P. M. The following night he sang at 11 P. M. during a hard rain. From this date I made nightly observations on this particular bird; the song continuing regularly until May 3, when it suddenly ceased, and on May 19 the nest containing four eggs was found in a rose bush tied to the side of the house. The following day all the eggs hatched. On the 28th something disturbed the young, causing them to leave the nest.

During this period the night song was not heard although the male continued to sing throughout the day; and not until June 2 was the night singing resumed. Then followed a period of song though not as regular as before, continuing to June 15th. Later I discovered that a second brood had been raised though not until too late for note taking.

The male appeared to roost in or near a raspberry patch not far from the nest, and except on rare occasions the song was heard from very nearly the same location.

The song itself was subject to considerable variation; in one phase the day song was closely followed, the change, if any, being a simple repetition of the closing notes. In the second phase, the final notes were greatly elaborated, suggesting a canary's most beautiful tones, only infinitely richer and finer. This phase was heard on two occasions and on neither of those nights did I hear the first.

The weather evidently has little influence upon the song, the chief factor connected with it seeming to be the stage of the reproductive cycle at a given time.—A. J. STOVER, *Corvallis, Oregon*.

Rose-breasted Grosbeak Breeding at Wheeling, West Virginia.—

I wish to record the nesting and successful raising of a brood of young of the Rose-breasted Grosbeak (*Zamelodia ludoviciana*) in a small English hawthorn tree in our front yard during May, 1912. This year (1913) during the month of June a pair of this same species nested in a cherry tree in the front yard of my brother-in-law on the opposite side of the Park View Lane. This bird has become a frequent visitor in the spring and early summer and its shrill familiar voice is often heard along the small streams as well as along Wheeling Creek near Elm Grove, W. Va.—ROBERT B. McLAIN, *Wheeling, W. Va.*

The Orange-crowned Warbler at Englewood, N. J.—On May 18, Messrs. Nicholas F. Lenssen, S. V. LaDow and I spent the whole day in the field around Englewood, N. J. Birds of all kinds were more abundant than any of us had ever previously observed. While exploring an apple orchard near Bergenfield, N. J., Mr. LaDow suddenly arrested our attention by exclaiming:—"Here's something that looks like a Tennessee!" The bird, however, promptly disappeared. A few minutes later I heard an unfamiliar song, and following it up, I was pleased to see an Orange-crowned Warbler (*Vermivora celata celata*) in full song, just above my head on a dead twig of one of the apple trees. The first thing I noticed was the greenish underparts with faint dusky streaks on the breast, very distinct from the bright yellow of the Nashville and the pure white of the Tennessee Warbler. The next thing I noticed was that there was no white superciliary stripe, and the color of the underparts scarcely differed from that of the upperparts. The song was very distinct and characteristic—*chip, chip, chip-chippee, chippee-chippee*—the last notes about twice as fast as the first three. The bird was under observation in bright sunlight for ten minutes, and the whole party were equipped with powerful binoculars.—LUDLOW GRISCOM, *New York City*.

The Louisiana Water-Thrush (*Seiurus motacilla*) in Sudbury, Massachusetts.—On May 21, 1913, in the afternoon of a day spent in

the vicinity of the Wayside Inn I was standing on the dam of a pond looking down upon the bush growth bordering the outlet stream at its fall, when a bird flew up onto a low bough about on the level of my knees and remained on the perch it had taken. Its position was less than ten feet away with the breast toward me. I saw at once that it was a water-thrush, but perceived also at the first full look that the throat was unstreaked and white; that the superciliary stripe was strikingly white; and that the streakings of the breast were continued only at the sides leaving the underpart below the breast unstreaked. It was, therefore, recognized as a Louisiana, and not a Northern, Water-Thrush. There was scarcely a tinge of buff on the underparts as they were presented to me. The bird scarcely moved for probably five minutes. The range of view was so near that I had no need to use the field-glass. No leaf or twig intervened between us. As the aspect was essentially a full front view, I could not perceive that the bill was larger than the bill of the northern species. This distinctive feature, however, was not needed for an unmistakable identification. When, after something like a five-minute period of time during which the bird was resting from all activity and I, so to speak, was photographing it upon my retina, I moved a step for a slight change in point of view, it became aware of my presence and instantly taking wing disappeared among the bushes below and was not seen again.

The only fully accepted record of the Louisiana Water-Thrush in Eastern Massachusetts, so far as I am aware, is that of one seen by Mr. Bradford Torrey at Wellesley Hills, Mass., on April 13, 1902, which "remained for at least ten days, being last seen on the 22d" (Auk, XIX, 1902, p. 292). One other record (Auk, XIX, 1902, p. 292) of a bird seen by Messrs. Francis G. and Maurice C. Blake on the north bank of the Charles River above Waltham in 1902 bears the date of May 21. This record Mr. William Brewster in his 'Birds of the Cambridge Region,' p. 398, is inclined to discredit for reasons which he states. I may be allowed, perhaps, an expression of more confidence in the correction of the identification from my knowledge of the Blake brothers as very careful observers through much companionship with them afield at that time. The date of their record, it will be observed, is identical with this record which I am now able to furnish.

I had already visited the waterfall at noon on my way farther and had not seen the bird, but upon the second visit in the middle of the afternoon it presented itself at once under the most favorable conditions of view, as has been described. I visited the spot again three days later, but the water-thrush which was then present was as clearly *Seiurus noveboracensis noveboracensis* as the bird of the 21st was *Seiurus motacilla*.

The location of this Louisiana Water-Thrush was rather less than a mile from the nesting place of the pair of Blue-winged Warblers in 1909 (Auk, XXVI, 1909, p. 337).—HORACE W. WRIGHT, Boston, Mass.

Kentucky Warbler in Massachusetts.— On June 22, 1913, while walking in the Arnold Arboretum, at Jamaica Plain, Massachusetts, the writer heard the call note of a warbler followed almost immediately by a song very much different from that of the regular local members of the family. The bird was finally placed in a low moist spot which was covered with rather a heavy growth of high bushes near some oak trees and a spring. I was very much surprised when it proved to be a finely plumaged male Kentucky Warbler (*Oporornis formosus*). The bright yellow underparts and the black stripe running down the side of the throat were quite conspicuous. The black crown was not so plain, although the yellow about the eye was easily seen. There was not any white evident in the plumage. The warbler was observed from about 12.30 to 1.15 P. M. and was in song most all of the time. The notes seemed to the writer to be rather like two of those of the Ruby-crowned Kinglet (*Regulus calendula calendula*), also recalled the Carolina Wren (*Thryothorus ludovicianus ludovicianus*). The song was a loud clear whistle of three or four double notes. While under observation the bird did not at any time perch above twenty feet from the ground nor did it fly over a rod from the place where it was first seen. Once I approached to within six feet of it.

Supposing at the time that this was the first record of an *Oporornis formosus* for Massachusetts and desiring corroboration I telephoned to Mr. Richard M. Marble of Brookline, who, with Mr. Joseph Kittredge, Jr., also of Brookline, met me in the Arboretum, that same afternoon. The bird was soon found and both Mr. Marble and Mr. Kittredge identified it as a male Kentucky Warbler (*Oporornis formosus*). The late date, June 22, led me to look for some signs of breeding, but although I searched for several days afterwards I was unable to find even the bird.

This appears to be the second record for Massachusetts, as Mr. Horace W. Wright reports one at Wellesley on May 14, 1907 (Auk, July, 1907).—
HAROLD L. BARRETT, Jamaica Plain, Mass.

Some Observations on a Pair of Brown Creepers (*Certhia familiaris americana*).— On June 11, 1913, while walking through a strip of woods on Cape Elizabeth, Maine, in company with Mr. A. H. Norton of Portland, I found a pair of Brown Creepers among the dead trees along the banks of a brook. Most of these were evergreen trees and a great many of them were dead with pieces of the bark still attached. A careful search failed to reveal any sign of the nest, which I felt sure must be somewhere in the vicinity.

On June 14, I returned to the same place and found the birds again. I watched them and found that they were gathering something from the trunks of the trees. I kept my eyes on one of the birds which had its bill full of something, and saw it disappear off to my left. I changed my position about twenty-five yards and within five minutes had the pleasure of seeing one of the birds disappear in a hole under a large piece of bark on a fir stump.

My time was limited and I was only able to see that both birds visited the nest and that neither of them went directly to the nesting tree but went first to a hemlock tree which was about six feet away.

On June 17, I again returned, prepared to stay as long as there was sufficient light to see by. My observations began at about 3:15 P. M. and were tabulated as follows:

- 3: 19 both birds came to the nest,
- 3: 20 one bird
- 3: 22 " "
- 3: 23 one bird; both then came to trees within 15 feet of me, one on either side.
- 3: 24½ one bird,
- 3: 26 same bird,
- 3: 35 both birds, one waiting at the entrance till the other left,
- 3: 37½ one bird, staid half a minute,
- 3: 38 " " " " " "
- 3: 39 " " " " " "
- 3: 41 " "
- 3: 50 " " staid half a minute,
- 3: 51 " "
- 3: 56 both birds in succession,
- 3: 59½ one bird
- 4: 08 " "
- 4: 12 " "
- 4: 14 the other bird, both in sight,
- 4: 17 one bird
- 4: 18 " " staid half a minute
- 4: 22 " "
- 4: 27 " " staid half a minute, followed immediately by the other bird,
- 4: 36 one bird with what looked like birch bark or moth wings of some kind,
- 4: 38 one bird followed immediately by the other,
- 4: 41 one bird with moth or flying insect of some kind.

On one trip I thought I saw one of the birds taking the excreta from the nest to a tree about fifty paces away, but up to 4:41 I believed that the birds were building. After the visit at that time I was confident that they were feeding young and I went over to the nest to investigate. I enlarged the entrance hole a trifle and looking in could see two young. I put one of my fingers into the hole and could hear the young birds climbing up inside the bark. When I looked into the nest again it was apparently empty. I then started to remove the piece of bark to which the nest was attached and all except one of the young birds left the nest and flew away, making flights of about twenty yards.

As soon as the young birds began to leave the nest the parents became very excited and one of them, probably the female, alighted on a tree

almost within reach. Once she flew by my head so close that I could hear the buzzing of her wings. She continued to fly around me as long as I remained in the vicinity of the nest. The other parent bird appeared very much alarmed too, but never ventured nearer than fifteen feet. Both birds kept up a continual scolding.

The young had left the nest so quickly that I was unable to count them but I thought that five birds left the nest, which, with the one remaining in the nest would make the total of six. This seems to be in keeping with other records which have been published.

After examining the nest I went back to my observing point and waited to see what would be done about the young bird left in the nest. One of the parent birds returned twice but would not go inside. I found one of the birds which had left the nest and the parents became very much alarmed when I tried to catch it.

The entrance to the nest was six feet above the ground: it was two and a half inches long and three quarters of an inch wide. It was so narrow that it was impossible for the parent birds to go into the nest in a natural manner; they invariably entered and left the nest head first with the back toward the stem of the tree. In all visits neither bird ever flew directly to the nesting tree, always going first to the hemlock above referred to.

The nest was secured to the bark rather than to the stem of the tree but in loosening the bark I noticed several silk like threads leading from the nest to the stem of the tree. On the detached nest these show as little balls of dark gray material, probably from the cocoon of some caterpillar. The nest is formed principally of twigs of the fir, these being used to make the foundation of the nest where the bark is some distance from the stem. It is lined with pieces of birch bark and the inner bark of the fir. The rim of the nest has the usual crescent shape, the horns being two inches and a quarter higher than the rim of the nest proper. The depth of nest outside is seven inches, inside two inches, outer diameter six inches, inner diameter three inches, greatest thickness of nest (lower or foundation part) is two inches. The nesting site is about one and one half miles from the ocean and at an altitude of about forty-five feet. This is the first record of the breeding of the bird in this vicinity.

The only call I heard was the "tseet" usually heard when the birds are flying from one tree to another. This call was almost invariably given when the birds were coming to the nest. Several times I saw one of the birds alight on the hemlock tree near the nest, and with wings aquiver give the same call. Its manner and appearance then were those of a well grown young bird calling for food.—I. RALPH MEYER, LIEUT. U. S. A., Port McKinley, Portland, Me.

Bicknell's Thrush in Franconia Notch, N. H.—Last summer (1912) a friend and myself found a thriving colony of Bicknell's Thrush (*Hylocichla aliciae bicknelli*) on Mt. Pemigewasset, New Hampshire, at an

elevation of 3,300 ft. On June 29, 1913, we found them at Lonesome Lake, 2800 ft., which is on top of one of the spurs of Cannon. We noted six singing males and saw one bird singing at a range of ten feet. The Olive-back was also present. We did not see them here last year. They were near the path in a mixed growth of fir, balsam, and spruce, yellow and black birch, rock maple and mountain ash.—ALICE COREY, *Plainfield, N. J.*

Destruction of Robins in a Storm.—There occurred on Long Island about midnight, Friday, August 29, the most severe electric storm I have ever witnessed. During my forty years of residence at Floral Park, I have never known a summer storm so severe as to kill any mature bird in full strength, but the one above referred to annihilated the Robins that live in the trees about my lawn. Thirty-six were picked up the next morning on about an acre of ground, and others in the near vicinity brought the total up to about fifty. The English Sparrows were very abundant also but very few were killed; the Starlings escaped uninjured as far as I can learn. I have hardly seen a Robin since that fatal night. The storm was accompanied by high wind although not severe enough to uproot trees or break branches to any considerable extent, but it was accompanied by the heaviest downpour of rain I have seen in many years and lasted for a considerable time.

The birds were evidently blown out of the trees where they were roosting and perished from the awful wetting they were subjected to on the ground.—JOHN LEWIS CHILDS, *Floral Park, N. Y.*

Some Land Birds at Sea.—While traveling from New Orleans, La., to Havana, Cuba, in May, 1913, I was much interested to find that there were several wild birds taking passage with us. We left the mouth of the Mississippi River about 10 A. M., May 11, and next morning, we were probably more than half way across the Gulf of Mexico. It was then that I discovered aboard the vessel a Kingbird (*Tyrannus tyrannus*), a Barn Swallow (*Hirundo erythrogastra*), a Catbird (*Dumetella carolinensis*), and a swallow that I did not positively identify. The Kingbird would fly far out to one side, keep pace with the vessel awhile, and then return and perch on the rigging. The Barn Swallow's chief amusement seemed to be flying up and down the length of the decks; but the poor Catbird appeared rather bedraggled, and as far as I could observe, had no occupation. In the afternoon of the same day I discovered a warbler, unknown to me, hopping about the main deck aft. It seemed perfectly at home and allowed a rather close approach. We reached Havana very early next morning (May 13) so I have no idea when our bird passengers left us. These birds stayed with us practically the whole day (May 12) and I think the Catbird was seen by some of the passengers the night before. It seems remarkable that the birds should have remained so long on the vessel and allowed themselves to be carried many miles in a direction opposite to that of their migration.—ERNEST G. HOLT, *U. S. Biological Survey, Washington, D. C.*

Method of Recording Bird Music, with a Correction.—In my articles on the expressions of emotion in the Mourning Dove and the Passenger Pigeon ('The Auk,' October, 1911), in the musical notations I used sharps and flats in some cases to indicate a degree of sharpness or flatness less than a semitone. In the Mourning Dove record No. 1, the second note is only a trifle sharp; and the Passenger Pigeon records Nos. 4, 5, 7, and 8 each contain a downward run in which the intervals between successive notes are less than a semitone. I ought to have explained this in the original paper.

To measure the *tempo* of a bird song, the best instrument is a stop-watch. While the bird is singing, count the beats of its song, "Naught, one, two, three, . . ." Start the stop-watch with "Naught" and stop it with "ten." This gives a very accurate result. If the beats be rapid, count twenty instead of ten. In absence of a stop-watch, I think the best one can do is to count the beats for five seconds, or some other definite number of seconds, by an ordinary watch; but this is far less accurate.—WALLACE CRAIG, Orono, Maine.

RECENT LITERATURE.

Regulations for the Protection of Migratory Birds.¹—Under the provisions of the so-called McLean act the U. S. Department of Agriculture has been entrusted with the protection of our migratory birds. A committee was appointed by the Acting Secretary from the staff of the Biological Survey, consisting of Dr. T. S. Palmer, chairman, Dr. A. K. Fisher and Prof. W. W. Cooke, to draw up suitable regulations for the purpose and these together with a circular of explanation were issued late in June, to become effective October 1, 1913, after approval by the President.

The regulations are ten in number:

- I. defines migratory game and insectivorous birds.
- II. provides a closed season at night i. e.—from sunset to sunrise, on all migratory birds.
- III. provides a continuous closed season on migratory insectivorous birds, except an open season on Reedbirds in Delaware, Maryland, District of Columbia, Virginia and South Carolina, September 1-Oct. 31. Scientific collecting permits however are to be granted as at present.

¹ Proposed Regulations for the Protection of Migratory Birds. Circular 92, Bureau of Biological Survey, U. S. Dept. Agric. pp. 1-6. June 23, 1913.

Explanation of the Proposed Regulations for the Protection of Migratory Birds. Circular 93, Bureau of Biological Survey, U. S. Dept. Agric. pp. 1-5. June 23, 1913.

- IV. establishes a five year closed season on Band-tailed Pigeons, Little Brown, Sandhill and Whooping Cranes, Swans, Curlew, and all shore birds except the Black-breasted and Golden Plover, Wilson's Snipe, Woodcock, Greater and Lesser Yellow-legs. Also on Wood Duck in the northern and middle states west to Wisconsin, and on the Woodcock in Illinois and Missouri.
- V. prohibits shooting on the Mississippi and its branches from Minneapolis, Bismarck and Pittsburgh southward to New Orleans from January 1 to October 31.
- VI. divides the states into two zones; No. 1, those lying mainly north of latitude 40° and the Ohio, and No. 2 those lying mainly south of this line.
- VII. states that in reckoning closed seasons the first date mentioned is included and the last excluded.
- VIII. establishes closed seasons in Zone No. 1.
 - Waterfowl.* December 16-September 1. Exceptions: Massachusetts January 1-September 15; Minnesota and North Dakota, December 16-September 7; South Dakota, December 16-September 10; Oregon and New York outside of Long Island, December 16-September 16; New Hampshire, Long Island, New Jersey and Washington, January 16-October 1.
 - Rail.* December 1-September 1. Exceptions: Massachusetts and Rhode Island, December-August 1; New York including Long Island, December 1-September 16; California and Vermont, closed until September 1, 1918.
 - Woodcock.* December 1-October 1. Exceptions: Maine and Vermont, December 1-September 15; Massachusetts, Connecticut and New Jersey, December 1-October 10; Rhode Island, Pennsylvania and on Long Island, December 1-October 15; Illinois and Missouri, closed until September 1, 1918.
 - Shorebirds* (Black-breasted and Golden Plover, Wilson's Snipe and Yellow-legs) December 16-September 1. Exceptions: Maine, Massachusetts and on Long Island, December 16-August 1; Minnesota and North Dakota, December 16-September 7; South Dakota, December 16-September 10; Oregon, and New York other than Long Island, December 16-September 16; New Hampshire and Washington, December 16-October 1.
- IX. establishes closed seasons in Zone No. 2.
 - Waterfowl.* January 16-October 1. Exceptions: Kansas, Oklahoma, New Mexico and Arizona, December 16-September 1; Maryland, Virginia, North Carolina and South Carolina, February 1-November 1.
 - Rails.* December 1-September 1. Exceptions: Tennessee and Louisiana, December 1-October 1; Arizona, December 1-October 15.
 - Woodcock.* January 1-November 1. Exceptions: Louisiana, January 1-November 15; Georgia, January 1-December 1.
 - Shore birds.* (Black-breasted and Golden Plover, Wilson's Snipe

and Yellowlegs) December 16–September 1. Exceptions: Alabama, December 16–November 1; Louisiana and Tennessee, December 16–October 1; Arizona, December 16–October 15, Utah, Snipe, December 16–October 1; plover and Yellowlegs, closed until September 1, 1918.

- X. provides for hearings regarding proposed changes in the regulations. Applications should be made to the secretary of Agriculture and applicants should be prepared to show necessity for changes and submit evidence other than that based on personal convenience.

These regulations seem to us eminently fair and the sportsmans' interests have been given as much consideration as was compatible with the saving of the birds from extinction. Naturally there will be objections especially from points near zone or state boundaries, where different laws prevail on either side, as in southern New Jersey where Reedbird shooting is prohibited while on the other side of the Delaware River in the state of Delaware it is permitted. It seems unfortunate that the shooting of this bird could not have been stopped entirely except on the rice plantations of the south. Critics of the regulations should bear in mind that the welfare of each species as a whole has been the guiding principle of the committee, and without more or less drastic action at the present time the shooting of various birds would cease entirely in a short time, not through legislation but through the extermination of the species. Let all parties work together for the enforcement of the regulations irrespective of personal opinion or inconvenience for five years and it will be interesting to see what results will be apparent.—W. S.

Townsend's 'Sand Dunes and Salt Marshes.'¹—Dr. Townsend is already well known as a writer on nature and the present volume will be read with much interest by all who love the 'great outdoors'. He combines with an attractive style the keen observation of a trained field naturalist and the scientific regard for absolute accuracy, and his writings are therefore peculiarly satisfying.

The present volume deals mainly with the dunes and marshes of Ipswich, Massachusetts, and is based upon observations made during summer vacations and other brief visits during some twenty years. The chapter headings are: Sand Dunes; Tracks and Trackings; Vegetation in the Dunes; Land Birds of the Dunes; Swallow Roosts and Swallow Migration; Water Birds seen from the Dunes; The Harbor Seal; Salt Marshes—Their Past and Future; Birds of the Salt Marshes; The Horseshoe Crab and other Denizens of Sand and Mud;—and lastly a chapter on Bird Genealogy reprinted from 'The Auk' for July, 1912.

¹ Sand Dunes | and | Salt Marshes. | By | Charles Wendell Townsend, M. D. | Author of "The Birds of Essex County," "Along the Labrador Coast," "A Labrador Spring" and "Captain Cartwright and His Labrador Journal" | with numerous Illustrations from Photographs | Boston | Dana Estes & Company | Publishers. 8vo. 1-311.

The ornithologist will find many of these sketches replete with observations on bird habits and behavior.

The flight of gulls, the courtship of wild ducks, the booming of the bittern and the plumage changes of the sandpipers are all discussed. Besides, the Ipswich Sparrow, Pipit, Shore Lark and a few other land birds which one naturally expects to find along the shore, a surprising list of warblers — twenty-one species — has been observed among the dune trees in migration times.

In the make-up of Dr. Townsend's book the publishers have done their part well and the typography and binding are as attractive as is the text. — W. S.

Bailey's 'The Birds of Virginia.'¹— The wealth of excellent illustrations and the admirable typography unite in making Mr. Bailey's book one of the most attractive state lists that has yet appeared. The halftones are from photographs by the author and by many of his correspondents in different parts of the country, especially Messrs. C. F. Stone, O. E. Baynard, Thomas H. Jackson, W. Otto Emerson and Verdi Burtch, while the color plates are from paintings by Mr. E. L. Poole of the Delaware Valley Ornithological Club, a young artist who gives much promise as a portrayer of animal and bird life.

The text consists of a statement of the range of each species reprinted from the A. O. U. Check-List with occasional alterations by the author and about a page descriptive of nest and eggs, local distribution, abundance and economic status; acknowledgment being made to the U. S. Department of Agriculture for data on the food of a number of species.

The matter thus presented combined with the extremely attractive make-up of the book will go far to realizing one of the objects of the publication, as set forth in the preface — namely to stimulate interest in our native birds and their welfare. Such a stimulus has long been needed in Virginia and other southern states and for this purpose especially Mr. Bailey's book should be welcomed. It is to be regretted however, that the text could not have been given the benefit for a careful editorial revision, for while remarkably free from typographical errors it is carelessly and loosely thrown together evidently under pressure of time with the result of being sometimes distinctly ungrammatical.

With regard to the author's second aim, to provide a "thorough systematic work on the breeding birds of the state for the needs of the advanced ornithologists of our country," his volume is adequate so far as containing probably all the species and subspecies which breed in Virginia but it is frequently lacking in the detailed data that characterize modern ornithologi-

¹ The Birds of Virginia | By | Harold H. Bailey | with fourteen full page colored plates | one map, and one hundred and eight | half-tones taken from nature | treating one hundred and eighty-five species and subspecies: | all the birds that breed within the state | 1913 | J. P. Bell Company, Inc. | Publisher | Lynchburg, Va. | 8vo. pp. i-xxiii, and 1-362.

cal work. For instance the Olive-sided Flycatcher, Crossbill, Pine Siskin, Golden-crowned Kinglet, Brown Creeper, etc. are given as breeding birds without any actual records or references to records, while so far as we can judge their nests have not been taken in the state by the author. It is the actual records that the scientific ornithologist requires or at least an indication of where they may be found and an adequate state list should furnish this information. In the case of the Brown Creeper, moreover, one might suppose that it bred throughout the state as there is no mention whatever of its local summer distribution. The author seems not to have a clear conception of the nature of subspecies as he states that the breeding ranges of the two Parulas, the two Maryland Yellow-throats, etc., overlap in Virginia. If such is the fact, from the very nature of the case, they would cease to be subspecies and must be regarded as species. The remarks about winter Juncos must we think apply largely if not entirely to *J. hyemalis hyemalis* not to *J. h. carolinensis* which is the breeding form of the mountains.

One point in which Mr. Bailey's work is especially open to criticism from the 'advanced ornithologist' is the lack of any sort of bibliography and the very meagre reference to the work of others. Prof. Smyth's recent paper in 'The Auk' is freely quoted and there is an occasional reference to Dr. Rives' 'Birds of the Virginias,' but many other important records and papers could have been quoted to advantage. We trust that these may be supplied in another edition, as well as the editorial revision already suggested, which will bring the text up to the high standard attained in the illustrations and general make-up of the volume.—W. S.

Faxon on Brewster's Warbler.¹—In January, 1911, Dr. Faxon published an interesting account of observations on some families of warblers in a swamp at Lexington, Mass. A pair of Golden-wings reared only Golden-wings, a male Golden-wing and female Brewster's Warbler produced only Brewster's Warblers while another similarly mated pair produced Brewster's Warblers and at least one Golden-wing.

Observations on the colony were continued in subsequent seasons by the author and Dr. W. M. Tyler but with no satisfactory results until 1913, when a male Golden-wing was found mated with a female Blue-wing, the combination that was particularly to be desired. The development of the young was followed with great care and all of them eventually assumed the pure plumage of Brewster's Warbler, thus proving positively the nature of this so called species. As Dr. Faxon points out this is in exact accordance with Mendel's law, *chrysoptera* (pure) × *pinus* (pure) should produce only *leucobronchialis*, a Mendelian so called dominant hybrid; *chrysoptera* (pure)

¹ Brewster's Warbler (*Helminthophila leucobronchialis*) a hybrid between the Golden-winged Warbler (*Helminthophila chrysoptera*) and the Blue-winged Warbler (*Helminthophila pinus*). By Walter Faxon. Memoirs Mus. Comp. Zool. Vol. XL. No. 6, pp. 311-316. August, 1913.

× *pinus* (impure) should produce on the average *chrysoptera* and *leucobronchialis* in equal numbers; *chrysoptera* (impure) and *pinus* (pure), *pinus* and *leucobronchialis* in equal numbers, while a union of impure examples of each stock should produce equal numbers of *chrysoptera*, *pinus*, *leucobronchialis* and *lawrencei*. One of the young of this brood has been banded as well as a young Brewster's and Golden-wing, the offspring of a male Brewster's and female Golden-wing which were also under observation.

Should these birds return to the same swamp next year a family pedigree of three generations can be established. Be that as it may Dr. Faxon has finally demonstrated the true nature of Brewster's Warbler and removed from the field of discussion a topic which has for years been a favorite one upon which to build up theories and conjectures.—W. S.

The Natural History of the Toronto Region.¹—This handy volume "has been prepared by the Canadian Institute for the members of the Twelfth Geological Congress and for all who may have an interest in the history and natural history of the city and vicinity." It consists of chapters on the history, geology and life zones of the region, with lists of the various groups of animals and plants contributed by specialists; some merely nominal, others with annotations.

The lists of mammals and birds are by James H. Fleming and are accompanied by brief notes on the relative abundance and time of occurrence of the species, while the former is preceded by a short historical bibliography. Forty-one mammals and 292 birds are listed and the nomenclature is strictly up to date. The book will be of great assistance both to visitors and residents who wish to know something of the natural history of Toronto and to all ornithologists who desire an accurate reference list of Toronto birds. The typography and paper are good, and both publisher and editor are to be congratulated upon their work.—W. S.

Mathews' 'The Birds of Australia.'²—In the continuance of his great work, Mr. Mathews treats of the Limicolæ. We note the following new genera, *Anteleotringa*, p. 274, type *Totanus tenuirostris* Horsf.; *Dilelmatias*, p. 282, type *Gallinago hardwickii* Gray; *Parascolopax*, p. 290, type *Scolopax saturata* Hodgs.; *Chubbia*, p. 291, type *Gallinago stricklandi* Gray; *Homoscolopax*, p. 291, type *G. imperialis*; *Neospilura*, p. 293, type *Scolopax solitaria*; *Eugallinago*, p. 294, type *G. macrodactyla* Bonap. and *Subspilura*, p. 295, type *G. megala* Swinhoe. New subgenera are: *Nesopisobia*, p. 245, type *Totanus damacensis* Horsf.; *Macrodera*, p. 294, type *G. nobilis*; *Odurella*, p. 294, type *G. brasiliensis* Sw.

¹The natural History of the Toronto Region [Ontario, Canada] edited by J. H. Faull, B. A., Ph.D. [Associate Professor of Botany, University of Toronto] Toronto [Published by the Canadian Institute] 1913. 8vo. pp. 1-419, seven halftone plates and five maps. William Briggs, publisher, Toronto, Ont. \$2.

²The Birds of Australia. By Gregory M. Mathews. Vol. III, part 3, pp. 205-300. August 18, 1913. Witherby & Co., 326 High Holborn, London, W. C.

Some changes in nomenclature affect North American birds, for instance *Pisobia aurita* (Latham) must become *P. acuminata* Horsf. since Mr. Mathews states that Sharpe was clearly in error when he claimed that Watlings drawing 244, upon which Latham based his name, represented this bird. It is obviously *Actitis hypoleucos*. Mr. Mathews moreover divides the genus *Pisobia* and places this species in *Limnocinclus*; *Actodromas* being a synonym of true *Pisobia* with *P. minuta* as its type.

The name of the Pectoral Sandpiper must change also, since *Tringa maculata* Vieill. is rendered invalid by *T. maculata* Linn. 1766, we therefore return to *pectoralis* of Say.

The American Knot is separated as *Canutus canutus rufus* Wilson while the Japanese race is described as new under the name *C. c. rogersi*.— W. S.

Mearns on New African Birds.¹— In working over the rich collections of African birds in the U. S. National Museum obtained mainly by himself, Dr. Mearns finds the following new Weaver-birds and Thrushes, *Estrilda rhodopyga polia*, from the Gato River, Southern Abyssinia, *E. rhodopyga hypochra*, *Granatina ianthinogastra roosevelti*, *Planesticus helleri*, *P. olivaceus polius*, *Geocichla piaggie keniensis* and *G. gurneyi raineyi* from British East Africa. While Dr. Mearns' first aim is naturally the description of the new forms obtained by him, ornithologists will await with interest a general account of the collections made on the Smithsonian and the Childs Frick Expeditions which he accompanied as naturalist.— W. S.

Riley on the Bahama Barn Owl.²— While accompanying the Bahamas Expedition of the Geographic Society of Baltimore a few years ago, Mr. Riley obtained a specimen of a peculiar looking Barn Owl which in the light of additional material now available he describes as new, under the name of *Tyto perlatus lucayanus*.— W. S.

Shufeldt's Studies of Fossil Birds.³— In the former of two recent publications on North American fossil birds, Dr. Shufeldt presents the results of a reëxamination of the Cope and Condon Collections and a study of

¹ Descriptions of three new African Weaver-birds of the Genera *Estrilda* and *Granatina*. By Edgar A. Mearns. Smithsonian. Misc. Collns., Vol. 61, No. 9, pp. 1-4. July 31, 1913.

Descriptions of four New African Thrushes of the Genera *Planesticus* and *Geocichla*. By Edgar A. Mearns. Smithsonian. Misc. Collns., Vol. 61, No. 10, pp. 1-5. August 11, 1913.

² The Bahama Barn Owl. By J. H. Riley. Proc. Biol. Soc. Washington, XXVI, pp. 153-154. June 30, 1913.

³ Review of the Fossil Fauna of the Desert Region of Oregon, with a Description of additional Material collected there. By R. W. Shufeldt. Bull. Amer. Museum Nat. Hist., Vol. XXXII, Art. VI, pp. 123-178. New York, July 9, 1913.

Further Studies of Fossil Birds with Descriptions of New and Extinct Species. By R. W. Shufeldt. Bull. Amer. Mus. Nat. Hist., Vol. XXXII, Art. XVI, pp. 285-306. New York, August 4, 1913.

other material belonging to the U. S. National Museum and the American Museum of Natural History.¹ A large amount of material is illustrated in half-tone, comprising 578 figures of bones or fragments arranged on 35 plates.

Colymbus parvus, *Polilymbus magnus*, *Phalacrocorax macropus* and *Olor matthewsi* from the Oregon Pleistocene are described as new.

In a second paper additional collections belonging to the same institutions are described. Ninety-six specimens are figured on nine plates. *Diatryma ajax*, and *Palaeophasianus* (gen. nov.) *meleagroides* from the Wasatch of Wyoming, are described as new, also *Aquila antiqua*, *A. ferox*, and *A. lydekkeri* from the Bridger Formation, Wyoming, and *Proictinia gilmorei*, from the Loup Fork of Kansas.—W. S.

Hahn on the Future of the North American Fauna.²—The late Dr. Hahn whose unfortunate death was mentioned recently in 'The Auk' has contributed a suggestive paper under the above title. While he has in mind animal life as a whole most of his remarks refer equally well to birds and he constantly quotes birds as examples. We cannot do better than to quote his own résumé in order to give an idea of the manner in which he has treated the subject. "Briefly the tendency of the North American fauna is toward mediocrity. Large species are giving way to small; bizarre species to commonplace. Marsh-loving and forest-loving animals disappear with the advance of civilization, and grass-loving species that are able to exist in fence rows and pastures survive. Animals that yield products of value vanish before the hand of man; likewise his enemies are destroyed unless protected by small size and great fecundity. Courage and the social instinct are at a discount and cunning and timidity at a premium."—W. S.

Doolin's 'Field, Forest and Stream in Oklahoma.'³—In this attractively printed and well illustrated volume, Mr. Doolin sets a high standard for game wardens' reports. As he says in his 'foreword': "An annual report which recorded merely receipts and expenditures would convey no information such as might lead the public to an understanding of the problems and difficulties that confront those who are desirous of saving all useful forms of wild bird and animal life from extermination. It is especially the purpose of this report to ask the people of Oklahoma for their fullest co-operation in the protection and conservation of disappearing wild life in this state."

¹ Cf. 'The Auk,' 1913, pp. 36-39, for a preliminary review of this study.

² The Future of the North American Fauna. By the late Walter L. Hahn, Ph.D. Pop. Sci. Monthly, August, 1913, pp. 169-177.
Cf. p.

³ Field, Forest and Stream in Oklahoma. Being the 1912 Annual Report of the State Game and Fish Warden, John B. Doolin, to the Governor of the State of Oklahoma, the Honorable Lee Cruce. Roy 8vo. pp. 1-159.

Following out these lines the author presents a number of interesting and readable chapters describing the beauties of field and forest in his state; fishing and hunting experiences and anecdotes of white man and Indian; and through it all is brought out the necessity for united effort in cultivating a proper appreciation of nature and in saving the wild life from extermination. Beside chapters on Water-fowl and Wild Turkeys there is a 'tentative list' of the birds of Oklahoma compiled by Prof. George W. Stevens of the Northwest Normal School and Oklahoma Geological Survey, which consists of 227 species with brief notes as to the character of their occurrence. This we believe constitutes the first Oklahoma 'state list.'—W. S.

Craig on the Stimulation of Ovulation in Birds.¹—Largely from a study of pigeons the author finds that egg-laying can be induced without the true sexual stimulus and comes to the conclusion that it is the result not of a single stimulus but of a complex in which environmental conditions play an important part. He cites the mating of two female pigeons with ovulation by both, and the influence of the nest and eggs in restraining the incubating pigeon from further sexual activity, in presenting his conclusions.—W. S.

Laubmann on Birds from Thian-Schan.²—This paper is based upon a collection of 1234 skins obtained by Dr. Gottfried Merzbacher in the Thian-Schan Mts., Turkestan in 1907-8. 198 species are listed with notes as to their relationship, distribution, etc. and synonymic references to other papers dealing with the same general region, a list of which is given in a bibliography. No new forms are described, but the paper forms a valuable contribution to the ornithology of the Chinese Empire.—W. S.

Stresemann, on East Indian Birds.³—Mr. Stresemann in a recent contribution to the 'Novitates Zoologicae' continues his miscellaneous notes on Indo-Australasian birds. These are as follows, numbering continuously with his previous instalment. XIX. The forms of *Artamus leucorhynchos* (L.); *A. l. humei* subsp. n. from the South Andamans. XX. Some forms of *Hypothymis azurea* (Bodd); *H. a. symmixta* Alor Island. and *H. a. oberholseri*, Formosa, are described as new. XXI. The forms of

¹ The Stimulation and the Inhibition of Ovulation in Birds and Mammals. By Wallace Craig. Jour. Animal Behavior. May-June, 1913, pp. 215-221.

² Wissenschaftliche Ergebnisse der Reise von Prof. Dr. G. Merzbacher im zentralen und östlichen Thian Schan, 1907-8. I. Vögel. von A. Laubmann. Abh. Königl. Bayern. Akad. Wissensch. Math.-phys. Klasse. XXVI Band 3. Abhandl. pp. 1-105. January 11, 1913.

³ Ornithologische Miscellen aus dem Indo-Australischen Gebiet. Von Erwin Stresemann. Nov. Zool., vol. XX, pp. 289-324. June, 1913.

Die Vögel von Ball. Aus den Zoologischen Ergebnissen der II. Freiburger Molukken-Expedition. Nov. Zool., Vol. XX, pp. 325-387. June, 1913.

Eurystomus orientalis (L.), *E. o. gigas*, subsp. n. S. Andamans, *E. o. connectens* subsp. n. Moa Isl. XXII. The forms of *Amaurornis phoenicura* (Forster). XXIII. The forms of *Baza subcristata* (Gould), *B. s. pallida*, Kei Islands, and *B. s. megala* Fergusson Island described as new. XXIV. The forms of *Cinnyris clementiae* Less., *C. c. keiensis* subsp. n. Kei Islands. XXV. The forms of *Macropygia ruficeps* (Temm.), *M. r. nana* subsp. n. Kina Balu, Borneo. XXVI. The forms of *Alcedo ispida* in eastern and southern Asia and the Indo-Australasian Archipelago, *A. i. pelagica* subsp. n. St. Aignan, Isl. XXVII. The forms of *Thriponax javensis*, *T. j. confusus* subsp. n. Mt. Arayat, Luzon. XXVIII. The forms of *Centropus sinensis* (Steph.), *C. s. anonymus*, Tawi-tawi and *C. s. parroti*, Ceylon, are described as new.

The method adopted by Mr. Stresemann in his 'Miscellany' is to be commended as instead of merely describing a lot of new forms, he gives us the benefit of his study of all the related forms, presenting as it were a series of little monographs. In Another recent paper, he treats of the birds collected on the island of Bali on the second Freiburger Moluccan Expedition, additional species previously obtained on the island are also listed bringing the total to 149. The following are described as new: *Hemiprocne longipennis harterti*, *Surniculus lugubris brachyurus*, *Phœnicophaps curvirostris deningeri*, *Phylloscopus borealis examinandus*, *Pachycephala grisola secedens*, *Criniger gularis balicus*, *Oreosterops javanica elongata*, *Aplonis panayensis gusti* and *Aplonis panayensis leptorrhynchus* are described as new. There is also a valuable discussion of the plumage changes of *Centropus*.

At the close of this paper the author presents some zoogeographical conclusions regarding the relationship of the avifauna of Bali, Lombok, Java, Sumatra and Sumbawa which are of much interest. In an effort to meet the problem that confronts all students of geographic distribution — i. e. the relative value to be given species and subspecies in contrasting faunas — he differentiates between species which are broken up into closely related geographic races and well marked species which are not. The latter he terms 'Altform,' while the races of the complex species ('Art') he terms 'Jungformen.' This is a novel terminology but it draws attention to a matter of no little importance, especially in view of the enormous multiplication of subspecies which is now taking place.— W. S.

Menegaux on Ostrich Farming.¹— In this valuable paper one can find conveniently arranged, information on practically any phase of the subject of Ostrich rearing or the Ostrich plume business. The several geographic races of the bird are first described; then the structure of the plume and its development, and the variation in the feathers on different parts of the body are discussed. Chapter three deals with a history of the use of

¹ L'Élevage de L'Austruche, Récolte et Commerce des Plumes par A. Menegaux. Bibliothèque d'Agriculture Coloniale, pp. 1-156. Paris. 1913.

Ostrich plumes, and the commercial terminology and points used in valuing plumes. Chapter four considers the methods of procuring the plumes from the birds and other chapters relate to the commerce in Ostrich plumes, the domestication and care of the birds, and the extension of Ostrich farming. When we learn that in 1911 over 800,000 pounds of Ostrich plumes were exported from Cape Colony, valued at about ten million dollars, and that Ostrich raising is now going on in Transvaal, Australia, Algeria, Tunis, Soudan, Madagascar, Egypt and the United States, we begin to realize the magnitude of this business, and more than ever the absolute lack of necessity for tolerating in any way, shape or form the traffic in wild bird plumage. M. Menegaux has furnished us with a valuable work of reference which can be read with profit by all interested in the feather trade, either commercially or in its relation to bird protection—W. S.

Dubois' List of the Birds of Belgium.¹— Dr. Dubois prepared in 1885 a list of Belgian birds of which this is a 'new edition.' Eight names in the old list are cancelled and 25 species added during the twenty-seven years that have intervened making a total of 353. In comparing the avifauna of Belgium with that of any of the United States it may be of interest to state that Dr. Dubois finds that 70 species are resident, 57 summer residents, 39 winter visitants, 49 regular transients and 123 irregular or accidental. To these he adds as a separate category, 15 climatic varieties—surely a severe reflection upon the 'subspecies.' Dr. Dubois is very conservative in matters of nomenclature adhering to the twelfth edition of Linnæus, and rejecting tautonomy and trinomials, his 15 climatic varieties being designated by the old-fashioned "var."—W. S.

McAtee on the Relation of Birds to Grain Aphides.²— Mr. McAtee presents an elaborate report of a week's study of birds in connection with an outbreak of Grain Aphides near Winston Salem, N. C. Of the species present which fed upon the Aphides the following were the most important and in the order named, Field Sparrow, Goldfinch, Chipping Sparrow, Savannah Sparrow, Song Sparrow, Vesper Sparrow, and Snowbird. By estimating the number of birds present on the area of 100 acres which was under observation and the average number of Aphides found in the stomachs examined, Mr. McAtee concludes that these birds devoured about a million aphides a day, while migrants passing through at the time consumed as many more. It is interesting to see that all the species cited above are Fringillidæ, birds not usually credited with this sort of diet.—W. S.

Beal on Our Meadowlarks in Relation to Agriculture.³— The distribution and economic status of *Sturnella magna* and *S. neglecta* are here

¹ Nouvelle Revue des Oiseaux Observés en Belgique, par Le Dr. Alph. Dubois. Mem. Soc. Zool. France. Tom. XXV, 1912, pp. 162-209.

² Relation of Birds to Grain Aphides. By W. L. McAtee. Year book U. S. Dept. of Agriculture for 1912. pp. 397-404, 3 figs.

³ Our Meadowlarks in Relation to Agriculture. By L. Beal. Yearbook U. S. Dept. of Agriculture, 1912. pp. 279-284.

summarized on the basis of data and stomach material in possession of the Biological Survey. Five-sixths of the animal food of these birds proves to consist of beetles, caterpillars and grasshoppers which far more than counterbalances the occasional and usually local consumption of grain, peas, etc.—W. S.

Economic Ornithology in recent Entomological Publications.—

The output of publications of all branches of the Department of Agriculture has been abnormally small during the present calendar year. Hence we find that only two of those of the Bureau of Entomology contain noteworthy mention of the bird enemies of insect pests. The fruit tree leaf-roller (*Archips argyrospila*) has caused considerable loss to fruit growers in Colorado, New Mexico, and New York. Mr. John B. Gill, the author of the bulletin on this pest states¹ that several species of birds have been observed feeding on the larvæ. These birds are the Bluebird, Western Robin, Catbird, Redwinged Blackbird, Orchard Oriole, Kingbird, Phoebe and the English Sparrow.

In a Farmers' Bulletin² on the common white grubs, larvæ of May beetles, and well known serious pests, Mr. John J. Davis gives birds first place among the natural enemies. The Biological Survey has found adults or larvæ of May beetles in the stomachs of more than 60 species of birds, a fact mentioned by Mr. Davis. Some of this author's original testimony is as follows:

"Probably the most important of these enemies are the birds, especially crows and crow blackbirds. Fields of timothy sod have been literally overturned by crows in their search for grubs, and in some fields the grubs were almost exterminated by them. Crows have often been observed following the plow in infested fields, eagerly picking up every grub that was unearthed. Mr. Henry Holzinger, of Lancaster, Wis., said that Crow Blackbirds followed the plow in great numbers where he was turning over a sod field in the spring of 1912. In one instance he watched a single blackbird eat many grubs, apparently its full capacity, and then gather as many as it could hold in its beak and fly away. In this case the bird destroyed in all 20 grubs in about 1 or 2 minutes. This habit of eating a large number of grubs and then flying away with its beak full was reported as a common occurrence with the blackbird. Mr. Fred Nelson, of Tabor, S. Dak., stated that his attention was directed to the unusual abundance of grubs in his field in the fall of 1911 by the blackbirds which came in flocks and followed him as he plowed. He soon learned that they were gathering grubs. After picking up several grubs each bird would fly back to the trees a short distance away and soon return. Thus there was a continuous flight from the trees to the ground and from the ground to the trees. Besides crows and blackbirds practically all of our common birds feed on white grubs or their adult forms, the May beetles." — W. L. M.

¹ Bulletin 116, Part V, U. S. Bureau of Entomology, March 12, 1913, p. 102.

² No. 543, U. S. Department of Agriculture, July 18, 1913.

Collinge's 'The Food of Some British Wild Birds.'¹—With the subtitle "A study in economic ornithology" and the limiting word 'some' in the main caption, it would appear that this little book deserved to escape censure because it does not absolutely settle the economic status of British birds. But it has nevertheless been rather pointedly criticised² evidently by someone with a bias in favor of uniform protection of all birds. A few words of truth uttered by Professor Collinge about certain injurious species, apparently are all this critic was able to see in the book and his prejudice is such that these could not be endured. This censorious reviewer states "it cannot be said that his (Collinge's) book greatly advances knowledge on this debated subject."

This statement, which serves chiefly to manifest the ignorance of this reviewer, is not only untrue but slanderous. Professor Collinge's book reports on the original examination of more than 3,000 stomachs of British birds, and is therefore by far the largest single contribution to its subject thus far made. The facts that the author includes digests of the researches of other works and gives a comprehensive bibliography are also held up against him by the afore-mentioned censor. The work has simply been done in modern and excellent style, and these inclusions make it immensely more valuable to all really interested in its subject matter.

Professor Collinge's book includes besides 4 general introductory and 3 concluding chapters, detailed reports on the food of 29 species of birds, besides chapters on "Birds as destroyers and distributors of weed seeds" and "Birds in relation to forestry."

The treatment by species includes an abstract of previously published evidence, tabulation of contents of stomachs examined, field observations by the writer, notes on the food of nestlings (when studied), examination of faeces (when made) and conclusions. The conclusion is preponderately favorable to 18 species and more or less unfavorable to 11. Professor Collinge elaborates upon and reiterates his previously expressed opinion as to the lack of beneficial influence in the case of seed-eating birds. He states that birds on the whole are praiseworthy in their relations to forests. All in all this is the best handbook of the food of British Birds in existence and should be in the hands of everyone who desires reliable information on economic ornithology in this particular field.—W. L. M.

Bigglestone on Nesting Behavior of the Yellow Warbler.³—This paper is based upon a continuous study of a nest of young Yellow Warblers from the time of the hatching of the eggs, and irregular earlier observations, the observer occupying a blind situated close to the nest. With the co-operation of eleven assistants it was possible to record the actions of parents

¹ London 1913, 109 pp.

² Bird Notes and News, Vol. V, No. 6, June, 1913, pp. 93-94.

³ A study of the Nesting Behavior of the Yellow Warbler (*Dendroica aestiva aestiva*.) By Harry C. Bigglestone. Wilson Bulletin, Vol. XXV, No. 2, June, 1913, pp. 49-67

and young on each day, from the beginning of feeding about 4.30 A. M. to its cessation at about 8 P. M. without interruption, aggregating 144 hours and 53 minutes. Such cooperation renders studies of this sort much less irksome. During this time the parents fed the young 2373 times and a table shows roughly the different sorts of food that were provided. There was no feeding by regurgitation. The egg shells were devoured by the parents as were the excreta during the earlier part of the nestling period. Later they were carried away. The female did all the brooding and both birds had a stereotyped method of approaching the nest. The incubation period was eleven days.

This paper will take its place with a number of similar studies that have appeared in recent years and which we trust may increase in number until all of our common species have been similarly investigated. A comparative study of such records will eventually yield most valuable generalizations.—W. S.

Stone on Venezuelan Birds.¹—This paper treats of the birds secured by the Francis E. Bond Expedition of 1911, in the Paria Peninsula and the Orinoco delta, all the collections there secured having been presented by Mr. Bond to the Academy of Natural Sciences of Philadelphia. After a summary of the movements of the expedition and some comments on the faunistic relationship of certain of the species found at Cariacito on the Paria Peninsula, the paper gives an annotated list of the one hundred and seventy-three species collected. As stated by the author "it is not surprising that no new forms were obtained. . . in a region so long familiar to bird collectors as the Orinoco delta," although the collection, which comprises five hundred and four skins, accompanied by full data, is of considerable value, "in view of the lack of definite localities in the case of early collections made in the Orinoco region." The two regions examined are quite different in character, forty-eight species having been taken at Cariacito which were not secured in the delta country, although the author does not consider the collection "sufficiently comprehensive to warrant any general deductions on distribution." Field notes on the coloration of the tarsi, irides and other soft parts, made by Mr. Thomas S. Gillin who prepared the specimens, and notes on distribution and abundance supplied by Mr. Stewardson Brown, who was also a member of the expedition, add value to the paper.—J. A. G. R.

Abstract of the Proceedings of the Linnæan Society of New York.²

—The Abstracts which cover the first 56 pages are full of bird records of

¹ On a Collection of Birds obtained by the Francis E. Bond Expedition in the Orinoco Delta and Paria Peninsula, Venezuela. By Witmer Stone. *Proc. Acad. Nat. Sci. Phila.*, 1913, pp. 189-212. Issued July 14, 1913.

² Abstract of the Proceedings of the Linnæan Society of New York for the years ending March 10, 1908; March 9, 1909; March 8, 1910; and March 14, 1911. Nos. 20-23, February 8, 1913, pp. 1-122, pl. I-XIV.

local interest, while two of the three papers published in full treat of birds. These are both by P. B. Philipp.—'Bird's-nesting in the Magdalen Islands,' and 'The Bird Colonies of Pamlico Sound.' Both are well illustrated by photographic reproductions and are accompanied by annotated lists respectively of 55 and 12 species with detailed accounts of the habits, abundance and distribution of the birds, and interesting incidents of the trips.

The society seems to be active and prosperous and the present creditable publication is the most pretentious of its series of sixteen issues.—W. S.

The Ornithological Journals.

Bird-Lore.¹ Vol. XV. No. 4. July-August, 1913.

The "Old Man." A Maine Coast Bird Study. By Frank A. Brown.
—Herring Gulls and Eider Ducks on Old Man Island, Machias Bay.

Five Little Waxwings and How They Grew. By George G. Phillips.—
One developed the wax tips to the secondaries in the juvenal plumage.

The Woodcock and Its Nest. By Francis M. Root.—With Photograph.

The Carolina Wren in Beverly, Mass. By Viola E. Crittenden.

Tragedies of Sandpipers' Nests. By Paul E. Gray.

The Massachusetts Audubon Society's Bird Lists.—Four lists of over 100 species each seen during the year. Competitive lists of any kind are always in danger of encouraging careless identification. The desire to add another species leads almost everyone to unconsciously err on the side of over-confidence.

Migration of N. A. Sparrows. By W. W. Cooke.—*Amphispiza bicolor* and *nevadensis* and *Melospiza lincolni* and *georgiana* are treated. W. De W. Miller describes the plumages, with a color plate by Fuertes.

The Audubon Society Leaflets consist of the Brown Thrasher by T. G. Pearson and the Tufted Puffin by W. L. Dawson.

The Condor.² Vol. XV. No. 3, May-June, 1913.

A Study of the Nesting of the Marsh Hawk. By A. A. Saunders.—
Illustrated.

The Wild Turkeys of Colorado. By W. W. Cooke.—Shows that *Meleagris gallopavo merriami* is apparently the only form that occurs in the state.

The Rocky Mountain Pine Grosbeak in Utah. By E. and A. O. Treganza.

Notes on Some Mesa County, Colorado Birds. By E. R. Warren.

Some Further Notes from the Tahoe Region. By M. S. Ray.

Notes from Buena Vista Lake and Fort Tejon. By Chester Lamb and H. B. Howell.

¹ Organ of the Audubon Societies. Edited by F. M. Chapman. Published by D. Appleton & Co., Harrisburg, Pa.

² Edited for the Cooper Ornithological Club, by Joseph Grinnell. Published at the Condor Office, Hollywood, California.

Notes on Certain Kansas Birds. By Alex. Wetmore.

Some Notes on the Nesting of the Short-eared Owl. By A. A. Saunders.

Synopsis of the Recent Campaign for the Conservation of Wild Life in California. By W. P. Taylor.

The Condor. Vol. XV. No. 4. July-August, 1913.

A Nest of the Dusky Horned Lark. By C. H. Kennedy.

Sierra Storms and Birds. By F. S. Hanford.

An Introduction to the Study of the Eggs of the North American Limicola. By R. W. Shufeldt.—Five plates.

With the Band-tailed Pigeon in San Diego County. By L. M. Huey.

The All-Day Test at Santa Barbara. By W. L. Dawson.—108 species seen in a day.

The Wilson Bulletin.¹ Vol. XXV. No. 2. June, 1913.

A Study of the Nesting Behavior of the Yellow Warbler (*Dendroica aestiva aestiva*). By H. C. Bigglestone.—See p. 603.

Some Records of the Feeding of Nestlings. By Lynds Jones.—Observations during part of the nestling period on Field Sparrow, Song Sparrow and House Wren.

Preliminary List of the Birds of Northern Passaic County, N. J. By L. S. Kohler.—144 species listed.

The Extermination of the Wild Turkey in Clayton County, Iowa. By Althea R. Sherman.—An interesting historical compilation.

Notes on the Sage Hen. By S. S. Visher.

The Oölogist.² Vol. XXX. No. 7. July 15, 1913.

Winter Birds of Egypt. By F. T. Pember.—Observations during six weeks on the Nile.

The Oölogist. Vol. XXX. No. 8. August 15, 1913.

Several articles on bird life on the Isle of Pines. By A. C. Reed, with illustrations of nests, etc.

Breeding Warblers of Harvey's Lake, Luzerne Co., Pa. By Archie Benners.

The Ibis.³ X Series. Vol. I. No. 3. July, 1913.

On a small Collection of Birds from Henderson Island, South Pacific. By W. R. Ogilvie-Grant.—Colored plate of *Vini stepheni* (North).

The Birds of Hong Kong, Macao, and the West River or Si Kiang, in Southeastern China, with Special Reference to their Nidification and Seasonal Movements. Part III. By R. E. Vaughan and K. H. Jones.—Treats of the Pigeons, Gallinaceous and Water Birds, concluding the paper. In an appendix *Pericrocotus stanfordi* from southeastern China is described as new.

The Evolution of Adaptation in Parasitic Cuckoos' Eggs. By E. C.

¹ Edited for the Wilson Ornithological Club by Lynds Jones, Oberlin, Ohio.

² Edited and published by R. M. Barnes, Lacon, Ill.

³ Edited for the British Ornithologists' Union, by W. L. Sclater. Published by R. H. Porter, 7 Princess St., Cavendish Sq., W., London.

Stuart Baker.— After many years study of Asiatic parasitic Cuckoos the author claims that eggs of parasitic Cuckoos have undergone, or are undergoing, a process of adaptation, and that the majority of foster parents fail to recognize differences in size or shape between their eggs and that of the Cuckoo but do recognize differences in color. We cannot, however, regard the evidence of adaptation as conclusive. The theory would seem to necessitate the parasitism of one race or strain of Cuckoos upon one species of bird and another race upon a different species, and upon this point we have no evidence whatever.

On the Linnæan Names *Strix funerea* and *Anser erythropus*, and on the Species which should be Referred to them. By Einar Lönnberg.— The use of *funerea* for Tengmalm's Owl as adopted in the A. O. U. Check-List but rejected in the recent British List is upheld upon what seems to be satisfactory evidence, while *Anser erythropus*, is shown to refer to the Lesser White-fronted Goose.

A Reference List of the Birds of New Zealand. By Gregory M. Mathews and Tom Iredale (continued).— The following are described as new: *Herodias alba maoriana*, *Carbo carbo steadi*, *Circus approximans drummondii*, *Nesierax pottsii*, *Cyanoramphus auriceps macleani*, *Strigops habroptilus innominatus*, *S. h. parsonsi*, *Sauropatis sanctus forsteri*, *Acanthositta chloris granti*, *Myiomoira macrocephala marrineri*, *Rhipidura flabellifera kempii*, also the genera *Mesocarbo*, type *Carbo sulcirostris* Brandt; *Maorigerygone* type *Curruca igala* Quoy and Gaimard and *Nesomiro*, type *Miro traversi* Buller.

Proceedings at the Annual General Meeting of the B. O. U. 1913.— Col. R. G. Wardlaw-Ramsay was elected president and Mr. E. C. Stuart Baker Secretary and Treasurer.

Bulletin of the British Ornithologists' Club.¹ No. CLXXXVIII. May 28, 1913.

Oreocincla whiteheadi, Khagan Valley, India, is described as new by E. C. Stuart Baker, who also has some remarks on other species of the genus, while *Laniarius helenæ*, Sierra Leone, W. Africa is described as new by H. J. Kelsall. W. R. Ogilvie Grant has diagnoses of the following new forms from Yemen: *Turdus menachensis*, *Parisoma buryi*, *Ænanthe yemenensis*, *Accentor fagani*, *Pseudacanthis* (gen. nov.) *yemenensis*, *Poliospiza menachensis*, and *Cryptolopha umbrovirens yemenensis*; all of which were procured by G. W. Bury.

H. M. Wallis presents a list of birds observed in the Balkans.

Bulletin of the British Ornithologists' Club. No. CLXXXIX. July 10, 1913.

The meeting here recorded which took place on June 11, marked the twenty-first anniversary of the club and it was fittingly celebrated by the

¹ Edited by W. R. Ogilvie-Grant. Published by Witherby & Co., 326 High Holborn, London.

presentation of a memorial to the chairman, Dr. P. L. Slater. Dr. Slater was however unable to attend and his death a few days later is announced at the end of the Bulletin.

A. F. R. Wollaston and C. B. Kloss, just returned from the mountains of New Guinea, gave an account of their journey and W. R. Ogilvie Grant described the following new species from their collection: *Rallacula klossi*, *Melospiza lugubris rostrata*, *Edolisoma utakwensis*, *Anthus wollastoni*, and *Pardigalla intermedia*.

Hon. Walter Rothschild remarked upon a recent trip to Algeria.

The following new forms are described. By Col. S. Clarke: *Stizorhina vulpina intermedia*, Victoria Nyanza Dist.; *Caprimulgus ludovicianus*, S. W. Abyssinia. By Major H. H. Harrington: *Suya criniger cooki*, Upper Burma; *S. c. yunnanensis*, Yunnan; *Prinia inornata burmanica*, Upper Burma; *P. i. formosa*, Formosa. By W. R. Ogilvie Grant: *Rhynchostruthus percivali yemenensis*, Yemen.

Claude H. B. Grant proposes the generic name *Heteromirafra* as a substitute for *Heteronyx* preoccupied.

British Birds.¹ Vol. VII. No. 2. July, 1913.

The sense of smell in the Gray Lag-Goose. By Mary G. S. Best and Maud D. Haviland.—A tent was erected near the nest for photographic purposes. When the wind was from the nest the bird exhibited no fear, when the wind was from the tent toward the nest she at first refused to remain on the nest, showing every appearance of fright, and later when incubating showed great uneasiness when the wind was in this direction. No explanation for her action seems plausible except that she 'winded' the photographer.

Discovery of a Colony of Tree-Sparrows on Inistrahull Island, Co. Donegal, Ireland. By C. J. Patten.

British Birds. Vol. VII. No. 3. August, 1913.

The Late Philip Lutley Slater. By A. H. Evans.—With portrait.

The Sequence of Plumages of the Common Eider. By J. G. Millais.

British Birds. Vol. VII. No. 4. September, 1913.

On the Breeding-Season and Clutch of the Steganopodes (Cormorant, Shag and Gannet.) By Rev. F. R. C. Jourdain.

Notes on the Breeding Habits of the Common Eider. As observed in the Outer Hebrides. By Mary G. S. Best and Maud D. Haviland.

On Incubation. By Eric B. Dunlop.—Data are presented showing that when incubation begins with the laying of the first egg the discrepancy in size of the young when all are hatched—if the last eggs hatch—is such that the older, stronger birds, get the bulk of the food, and the youngest bird and sometimes the next older, perish from starvation. Observations on Boobies agree in the fact that while two eggs constitute a clutch only

¹ Edited by H. F. Witherby. Published by Witherby & Co., 326 High Holborn, London.

one young is reared. Early incubation is undoubtedly a protective habit and that it should eventually result in mortality is very remarkable.

British Birds. Vol. VII. No. 1. June, 1913.

The Eclipse-Plumage of the Capercaillie. By W. R. Ogilvie Grant.

The Case of the Land Rail. By N. F. Ticehurst.— Proposes an inquiry as to the cause of its scarcity in certain sections.

Recovery of Marked Birds.

The Avicultural Magazine.¹ Vol. IV. No. 8. June, 1913.

For Love of Science. By Arthur G. Butler.— A rather remarkable article upholding the traffic in live wild birds and even the feather trade; though as the well-known statements, of the dealers that Egrets are no longer killed for their plumes is taken as fact the writer may be excused for some of his remarks. The paper gives rise to much discussion in subsequent numbers of the journal.

The Capercaillie at Home. By Martin Cunningham.

The Lesser Egret. By Hubert D. Astley.— A strong protest against the wearing of Aigrettes, etc.

The Avicultural Magazine. Vol. IV. No. 9. July, 1913.

The Great Bustard. By A. Trevor-Battye — With remarkable photograph of a male bird 'in display.'

The Finding of a Treasure. By Reginald Phillipps.— Interesting account of the Hobby, *Falco subbuteo*.

The Avicultural Magazine. Vol. IV. No. 10. August, 1913.

A Day in a Hampshire Garden. By Philip Gosse.— Familiar English birds discussed.

Numerous articles on cage birds in all three numbers.

Bird Notes.² Vol. IV. No. 6. June, 1913.

Some Interesting Birds. By W. T. Page.— Excellent photographs of the Great Spotted Woodpecker.

British Owls. By F. Dawson Smith.— Photographic illustrations.

Bird Notes from Trieste to Bombay. By H. Whistler.— Photograph of Hemprich's Gull in flight.

Bird Notes. Vol. IV. No. 7. July, 1913.

Three Pyteliae. By W. T. Page.— Colored plate of *P. melba* and *P. afra*.

Some Interesting Birds. By W. T. Page.— Photographs of *Philemon argenticeps* and *Calliste fastuosa*.

The Emu.³ Vol. XIII. Part 1. July, 1913.

On the Osteology of the Red Wattle Bird (*Anthochaera carunculata*). By R. W. Shufeldt.— Four plates.

¹ Edited for the Avicultural Society by Hubert D. Astley. Published by West, Newman & Co., 54 Hatton Garden, E. C. London.

² Journal of the Foreign Bird Club. Edited by Wesley T. Page.

³ Organ of the Royal Australasian Ornithologists' Union. Edited by A. J. Campbell and Charles Barrett, Melbourne, Australia. London Agents, Witherby & Co., 326 High Holborn.

The Eggs of *Gymnorhina* spp. By A. F. Bassett Hull — Colored plate.
Field Ornithology in South Australia. By S. A. White — An annotated list of 75 species with several views of the country. Capt. White submits, under protest, to the nomenclature of the new R. A. O. U. Check List and in a letter emphasizes his opposition to it.

Bird-Life of the Kow Plains (Victoria). By L. G. Chandler.— 101 species listed with notes and some excellent photographs of nests.

Field Notes on Some Rallinæ. By Miss J. A. Fletcher.

The Austral Avian Record.¹ Vol. I. No. 8. March 20, 1913.

New Subspecies of Birds from the Monte Bello Islands, N. W. Australia. By P. D. Montague.— *Eremiornis carteri assimilis* and *Anthus australis montebelli*.

Additional Species Described by Gould from Norfolk, Lord Howe, and Philip Islands. By Witmer Stone and Gregory M. Mathews.

The Genus-name *Meliphaga*. By Gregory M. Mathews.— The type was first properly designated by Gray, 1840, as *M. chrysotis*. The name therefore takes the place of *Ptilotis* of most authors while *Meliphaga* auct. nec. Lewin becomes *Zanthomiza* Swainson.

Additions and Corrections to My Reference List. By Gregory M. Mathews.— 21 new races proposed.

New Geneva. By Gregory M. Mathews.— 10 new genera proposed.

The Austral Avian Record. Vol. II. No. 1. August 2, 1913.

The Coloration of the Palate and Pharynx of Australian Birds. By J. Burton Cleland.

Additions and Corrections to My Reference List. By Gregory M. Mathews.— 10 new forms.

Mattingleya inornata Ramsay. By Gregory M. Mathews.

New Genera and Species. By Gregory M. Mathews.— 3 genera, one species.

On Some Interesting [New Zealand] Birds in the Vienna Museum. By Tom Iredale.— *Gallirallus hectori ruscheki* subsp. nov. and *Hemipuffinus* gen. nov., type *Puffinus carneiceps* Gould.

Ardea² [In Dutch] Vol. II. No. 2. June, 1913.

Abnormal Coloration. By A. E. H. Swaen.— With list of albinos.

Ornithological Investigations in Steil in Omstreken. By P. C. Riotte.— Annotated list of 55 species.

Ornithological Observations in Netherlands. By E. D. Van Oort.

Revue Francaise d'Ornithologie.³ Vol. V. No. 50. June, 1913.

On the Classification of Birds. By A. Dubois.— Dr. Dubois' System is by no means a modern one. He divides the Aves into three subclasses,

¹ Edited by Gregory M. Mathews. Published by Witherby & Co., 326 High Holborn, London, W. C.

² Edited for the Netherlands Ornithological Society by L. F. De Beaufort, A. A. Van Pelt Lechner and E. D. Van Oort. Published by E. J. Brill, Leiden.

³ Edited by A. Menegaux, 55 Rue de Buffon, Paris.

Ratitæ, Ptilopædes, and Gymnopædes, the last two based on the condition of the young at hatching. In the arrangement of orders the Parrots are put at the head of the system separated from the Scansores, etc., by the whole Passerine series. The Cormorants are allowed to stand with the other Steganopodes in the 'Ptilopædes' although the young are anything but downy, and on the other hand the *Caprimulgidæ* with downy young hardly agree with the 'Gymnopædes.'

Need of a New Catalogue of French Birds According to a Modern Classification. By Dr. Besaucèle.

For the Formation of a 'Committee on Migration' in France. By J. Delamain.

On *Aquila nævia*. By Gabriel Etoc.

Revue Française d'Ornithologie. Vol. V. No. 51. July, 1913.

Study of a Collection of Birds Obtained by M. Albert Pichon in Western Yunnan. By A. Menegaux and R. Didier.

Regarding the Buzzard. By R. Didier.—Food Habits.

Abnormal Eggs. By A. Legros.

On *Procellaria glacialis*. By N. Seguin-Jard.

Notes on the Spring Migration of 1913. By J. Delamain.

Ornithological Notes in Paris. By R. Babin.—*Columba palumbus* in the public gardens.

The Truth about the Birds of Prey. By F. Daguin.

Revue Française d'Ornithologie. Vol. V. No. 52-53. August-September, 1913.

The Ostrich in French West Africa. By G. Bouet.

Migration during 1912 and early 1913. By M. P. Petitclerc.—In several parts of France.

Egret Hunting in South America. By E. R. Wagner.

Ornithological Observations at Setif, Algeria 1895-1900. By A. L. Charrière.

Several local lists.

Journal für Ornithologie.¹ Vol. 61. Part 3. July, 1913.

On Nesting Data and Egg-Measurements of the Owls of the Western Palearctic Region. By Forstmeister Wendlandt.

A Contribution to our knowledge of the Ornis of French Guinea. By Adalbert Klaptocz.—Annotated list of 130 species collected at Mamou and Dabola. September, 1911-January, 1912.

A Contribution to our Knowledge of the Bird Life of the Eastern Erz Mountains. By Richard Heyder.

On the Distribution of the Birds of Lower Amazonia. By E. Snethlage.

Oological Notes from German East Africa. By Ludwig Schuster.

Journal für Ornithologie. Special Number I. 1913 [July].

¹ Edited for the German Ornithological Society by Dr. A. Reichenow. L. A. Kittler, Leipzig, Agent.

Fourth Annual Report on Bird Observations at the Imperial Biological Station at Heligoland. By Hugo Weigold.—An elaborate and interesting contribution to our knowledge of bird migration. Four maps show the movements of certain Gulls along the coasts of Europe.

Ornithologische Monatsberichte.¹ Vol. 21, No. 6. June, 1913.

Ornithological Notes in Holland 1911–1912. By Baron R. Snouchaert van Schauburg.

On Bird-Speech. By Richard Biedermann Imhoof.

On a New Raven from Baluchistan. By A. Laubmann. *Corvus splendens zugmayeri* subsp. nov.

Some Remarks on *Anser anser*. By W. Grafsmann.

Ornithologische Monatsberichte. Vol. 21. No. 7–8. July–August, 1913.

Remarks on the Bird Life of the European Forests at Different Latitudes. By Fritz Braun.

Jaegers on the Rhine. By Dr. le Roi.

Bee-eating Birds. By J. Gengler.

On the Biology of Some Strand Birds. By W. Hagen.

Northern Rarities at Lubeck. By W. Hagen.

Some Observations on *Carpodacus erythrinus* (Pall.). By R. Zimmermann.

On the Swimming of Dippers. By R. Fenk.

Two Days Among the Birds of Jericho. By Ernst Schmitz.

The Wintering of *Parus atricapillus borealis* in Finland. By H. Grote and H. B. Loudon.

New Forms from Spain and Portugal. By H. Weigold. *Saxicola ananthe nivea*, *Alauda arvensis sierræ* and *Alauda arvensis taiti*.

Ornithologische Monatsschrift.² Vol. 38. No. 5. May, 1913.

Ornithology in Croatia, 1910. By E. Rössler.

Totanus hypoleucus, *T. ochropus* and *Rallus aquaticus* as German Winter Birds. By O. Brauns.

Ornithologische Monatsschrift. Vol. 38. No. 6. June, 1913.

Fifth Yearly Report of the Experimental and Model Station for Bird Protection. By Hans Freiherr von Berlepsch.

Ornithologische Monatsschrift. Vol. 38. No. 7. July, 1913.

On the Bird Rocks of the Faroes. By Carl Küchler.

Revista Italiana de Ornitologia [In Italian].³ Vol. II. No. 3.

The Various Forms of Shrikes in Italy. By T. Salvadori.

Systematic Position of *Laniellus leucogrammicus*. By T. Salvadori.

¹ Edited by Dr. A. Reichenow. R. Friedländer and Son, Berlin N. W. 6, Karlsh. 11. Agents.

² Organ of the German Society for the Protection of Birds. Edited by Dr. C. R. Hennicke and Dr. O. Taschenberg. Agent Max Kretschmann, Creutzsche Verlagsbuchhandlung in Magdeburg.

³ Edited by Ettore Arrégoni Degli Oddi. Published by Stabellimento, Poligrafico Emiliano, Piazza Calderini 6, Bologna, Italy.

- Somateria mollissima* in Italy. By E. Balducci.
On *Caccabis labatei*. By G. Martorelli.
An Apparently New Form of *Gennæus*. By A. Ghigi.—*Gennæus fockelmanni* n. sp.

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- Mitchell, Dr. P. C.** On the Anatomy of *Baleniceps rex*. (Abst. Proc. Zool. Soc. London, No. 123. June 3, 1913.) — Many characters in common with *Scopus*, most of which occur also in the Storks. *Baleniceps* seems best placed in a group by itself equivalent to the Storks and Herons.
- Patten, C. J.** The Diurnal Migrations of Certain Birds Observed at the Tuskar Rock [Ireland]. (The Zoologist, June 16, 1913.)
- Stubbs, F. J.** The Velocities of Migratory Birds. (The Zoologist, July 15, 1913.) — Considers that birds probably do not fly in 'the teeth of the wind,' but take advantage of air currents for long flights.
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- Stanwood, C. J.** The Hermit Thrush at Home. (Nature and Culture May, 1913.) — A careful study of a nest and young. The incubation period is determined as 12 days.
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¹ Some of these journals are received in exchange, others are examined in the library of the Academy of Natural Sciences of Philadelphia. The Editor is under obligation to Mr. J. A. G. Rehn for a list of ornithological articles contained in the accessions to the library from week to week.

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CORRESPONDENCE.

Naturalists and 'Concealing Coloration.'

EDITOR OF 'THE AUK.'

Dear Sir: — In a letter just received from Mr. John T. Coolidge 3rd, now in British East Africa, he writes: "What you say about an object of uniform color against the sky seen from below has been impressed upon me lately. I find that in hiding to ambush game for moving pictures, it is essential to have an opaque background, otherwise you are sure to be detected, silhouetted against the sky. I am going to pin white strips of paper on my shoulders and helmet, when an opaque background is not obtainable.

I am doubtful about getting a Chapman's Zebra, but shall not fail to bring you a Grant's Zebra. Individuals vary tremendously but many Grant's Zebra have jet black stripes on a clean white ground. Rarely they have a faint supplementary stripe between the others and sometimes the stripes are brown on a yellow-cream ground, but I will look for a contrasty one. I have moving pictures of Zebra coming to water which show the extreme fear they have of approaching the bushy and reedy water holes, even by day. In the rains, they can drink out of pans in the open, but all permanent water is surrounded by bush or reeds, or usually both. * * *

This should remind the reader of the obviousness of what I have repeatedly tried to show to naturalists, that the laws of illumination and vision are the same the world over, and that the naturalists who have opposed the progress of this great biological discovery merely need to study these laws.

This well known variation of zebras' colors from black and white to brown and yellow is absolutely parallel to the variations of form and other characters, equally well known in almost all species. All the cases are more or less obviously traceable to corresponding variation in the animals' circumstances.

In the Zebra's case, for instance, pure black and white are a little the best costume where the sky, and particularly stocky (and therefore particularly opaque) reeds tend to be the animal's sole background. On the other hand, in a region where more translucent vegetation and less open sky are typical, so that the lightest note behind the zebra is apt to be mere lighted foliage oftener than sky, a brown and yellow zebra would often match a little closer than a black and white one.

Yours very truly,

ABBOTT H. THAYER.

Monadnock, N. H.
Sept. 11, 1913.

Migration and Periodic Accuracy.

EDITOR OF 'THE AUK.'

Dear Sir: — In Dr. John C. Phillips' highly interesting remarks on these topics (*Auk*, XXX, p. 202) he says "It would indeed be interesting if we could subject castrated birds to experimental conditions in order to test the strength of their migratory impulses, but this could hardly be accomplished."

It would be equally interesting if we could take species migrating northward for reproductive purposes, and subject them to a reversal of seasonal sequences, by introducing them into the southern hemisphere, and learn then what changes and variations of migratory impulses would follow.

Sometime ago the writer had occasion to make inquiries concerning the habits of introduced Cervidæ in New Zealand; the following letter (quoted only in relevant parts) from a well informed New Zealand Government Official came as a reply to these inquiries;

.... "In reply to your question regarding the introduction of deer into New Zealand: — The first red deer presented comprised 12, which were the gift of the late Prince Consort to the Colony. These deer were bred in Windsor Forest. Six of them were shipped to Wellington and six to Canterbury in the year 1862, but three only were landed alive, one stag and two hinds. These were sent to Wellington and kept by the Government in a stable, and after the interest and curiosity of the inhabitants were satisfied, the three deer were put into a dray, and carted over the Tararua Mountains into the Wairarapa district where they were liberated, and from that trio there are now quite 12,000 deer in the vicinity. In addition to producing larger antlers than their progenitors in Scotland, they also increased very considerably in general bulk. Rutting occurs generally from about the 20th of March to the 14th of April. This is dependent very largely upon the weather. When the weather is cold, the rutting takes place early, but should it be very mild and warm it does not occur until about the end of March or first week in April. Calving occurs generally in October and November. The stags shed their antlers in November. The rutting, calving and shedding of antlers, as you will see, are exactly opposite to the time in which these processes occur in England. If you take the English dates and defer them for six months you get the same results as regards the red deer in New Zealand."....

It is highly probable that these facts concerning the definite reversal of time of rutting, etc., have already been published, yet if so, such publication has up to date escaped the writer's notice. The facts just quoted constitute a most striking exposition of the seasonal influence on biologic functions and nutritional processes of great magnitude and importance to the species in question. It is possible that parallel alterations in migration, including "periodic accuracy," ovulation, nesting, and incubation would

be found to result could one successfully transplant and keep track of birds of migratory species from the northern to the southern hemispheres, or vice versa. The writer's only excuse for calling attention in this ornithological publication to data bearing directly on mammals only, is that the data also bear indirectly on cognate processes in birds, and should be available for future investigators of migration, etc,

Very truly,

W. H. BERGTOLD.

Denver, Colo.

NOTES AND NEWS.

PHILIP LUTLEY SCLATER, D. Sc., F. R. S., one of the original Honorary Fellows of the American Ornithologists' Union, died on June 27, 1913, at the age of eighty-three years. Dr. Sclater was known throughout the scientific world as secretary of the Zoological Society of London, a post which he filled from 1859 to 1902; and as a founder of the British Ornithologists' Union, and editor of its journal 'The Ibis' from 1866 to 1912 with the exception of a period of 12 years. He was also chairman of the British Ornithologists' Club since its organization. His services to ornithology throughout his long and active life can scarcely be overestimated, especially in connection with neotropical bird life of which he made a specialty, and upon which he published a long series of papers culminating with the volumes of the British Museum Catalogue of Birds, dealing with the Tanagridæ, Icteridæ, Tyrannidæ, Dendrocolaptidæ, Formicariidæ and other characteristic neotropical families. Dr. Sclater's loss will be felt by ornithologists the world over, especially by the many who were fortunate enough either through personal contact or through correspondence to count him as a friend.

At the request of the president of the American Ornithologists' Union, Dr. Daniel Giraud Elliot will deliver a memorial address on Dr. Sclater at the annual meeting of the Union in November, which will be published in full in the January number of 'The Auk.'

THE American Museum's zoölogical explorations in South America, which, during the past two years, have produced such interesting results in the northern parts of that continent, now promise to be even more effectively prosecuted in southern South America, under the leadership of Colonel Theodore Roosevelt, who in December plans to enter Southern Brazil.

Mr. George K. Cherrie and Mr. Leo E. Miller, both tried members of former Museum expeditions, will accompany Colonel Roosevelt as field assistants.

In Ecuador, Mr. Richardson has had a successful season and a shipment of 1400 birds and mammals has just been received from him. These specimens were collected in part on the coast from the northern extension of the arid coastal zone of Peru, and give definite information of where this arid strip merges into the humid coastal region of northeastern Ecuador and western Colombia.

Mr. Richardson also collected in the luxuriant forests of the Subtropical Zone at an altitude of 6000 feet, in the Temperate Zone about Quito and the base of Pinchincha, and in the Paramo or Alpine Zone of Pinchincha and Chimborazo, working on the latter mountain up to an altitude of

16,000 feet. Here Mr. Richardson secured not only specimens but accessories for a Habitat Group designed to represent the bird-life of the upper life-zone of this extinct volcano.

From Peru, the Museum's available study material has received an exceptionally important addition in the collections made by R. H. Beck for Mr. F. F. Brewster and Dr. L. C. Sanford. A large shipment lately received from Mr. Beck is particularly rich in little-known marine forms collected well off the coast of Peru, and in a beautifully prepared series of water-fowl from Lake Junin, situated at an altitude of 13,000 feet in the Peruvian Andes, which includes the Andean Flamingo and many other species not heretofore represented in the Museum.

THE thirty-first stated meeting of the American Ornithologists' Union will be held at the American Museum of Natural History, New York City, November 11-13, 1913, with a business meeting of the Fellows on the evening of the 10th. The annual subscription dinner will be held at the Hotel Endicott, close to the museum, which will also be the headquarters for visiting members.

These annual gatherings bring together upwards of one hundred bird students from various parts of the country. The attractions offered by the sessions of the meeting, and by the institution at which they are held, and above all the stimulus of personal contact with other ornithologists, tend to bring back those who have once been fortunate enough to be present at one of these gatherings. There are however a great many members and associates of the Union who have never attended a meeting and upon these especially we would urge the importance of at once making plans to be present in New York on November 11. One of the greatest privileges of membership is the opportunity of attending these annual meetings and a large attendance creates a wider and deeper interest in ornithology and strengthens the organization of the A. O. U. which has done so much for bird study in America.

WE learn from 'The Ibis' of the safe return of Mr. A. F. R. Wollaston's New Guinea Expedition. The party consisted of Mr. Wollaston, Mr. C. B. Kloss, five Dyak collectors, seventy-four Dyak carriers and an escort of 130 men provided by the Dutch Government. They succeeded in reaching the snow line on Mt. Carstensz about the end of February, and sailed for home April 3.

The collections include 1300 skins of birds and some of the novelties have already been described by Mr. Ogilvie-Grant. The party found animal life very scarce above 6,000 ft. Some Pipit-like birds occurred about 9000 ft. and a Dove and a Thrush between 13000 and 14000 ft.

JUST one hundred years ago there occurred an event the effect of which, on the development of American ornithology, it is impossible to estimate. On August 23, 1813, there died in Philadelphia, Alexander Wilson, aged

forty-seven years and forty-eight days. At the time of his death he was engaged in preparing for publication the eighth volume of his 'American Ornithology.' This confining work during the heat of midsummer seems to have been too much for a constitution never robust, and he was unable to withstand an attack of sickness which might not under other circumstances have proved serious.

Wilson's premature death removed him from the scientific world, when he was known to but very few outside of his own city. He did not live to hear the great praise that his work received in the scientific centers of England and France, and apparently had reaped no financial profits from its publication.

One cannot but speculate upon what the effect would have been upon later ornithologists had Wilson been spared to round out the period of life normally allotted to man. We know that he had a work on American Mammals in mind and also a popular manual or handbook on American birds. What influence would the existence of such works have had upon the similar publications of Audubon and Nuttall? Indeed the presence in America of an ornithologist of the reputation that Wilson must surely have attained, would certainly have had a tremendous influence upon the whole career of Audubon, who as it was had the field practically to himself.

In the March and June numbers of 'Bird Notes and News' are some interesting articles on the prevention of bird mortality at light houses. The idea of saving the birds which, attracted by the light, are supposed to dash themselves against the masonry or glass of the lighthouses, originated with the distinguished Dutch naturalist, Prof. Jac. P. Thijsse. He advanced the theory that the majority of the migrants fascinated by the glare, or so bewildered by it that they lose their sense of direction, fly aimlessly round and round seeking a resting place, until they become exhausted, fall, and perish.

For three years past he has had installed at the Terschelling Lighthouse on the Frisian Islands, ladder like perches of wood or iron covered with cloth, attached to the roof and platform. On nights when conditions are favorable for attracting migrants to the light, the perches become crowded with resting birds "to the number of ten thousand" and when dawn approaches the whole company resume their flight. The mortality has been so reduced that at present it does not exceed a hundred birds during the whole migration period.

Similar experiments are now in progress at St. Catharine's Lighthouse on the English coast, being conducted by the Royal Society for the Protection of Birds with the hearty support of the Lighthouse Board. It has already been demonstrated both here and at Terschelling that the racks or perches must be placed actually in the glare of the light, as the birds will not alight in the dark area above or below.

It is encouraging to find what promises to be such a simple solution of this problem.

MESSRS. WITHERBY & Co., 326 High Holborn, London, announce the publication, by subscription, of a work entitled *The Gannet: a Bird with a History* by J. H. Gurney, F. Z. S., illustrated with colored plates, maps and drawings; 600 octavo pages. Price to subscribers before October 30, 25 shillings.

DULTZ & Co., 6 Landwehrstrasse, München, announce a reprint of the ornithological articles contributed by R. P. Lesson to the "*Echo du Monde Savant*." This is one of the rarest of publications and the importance of Lesson's contributions make reference to it imperative. The reprint will be under the editorship of Dr. A. Menegaux.

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ERRATA.

Page 14, line 17, for *Habia* read *Zamelodia*.

" 302, " 33, insert after 'Emu,' XII, Part 3, January, 1913.

" 326, " 5, for 'county' read 'country.'

" 340, " 1, " **Megascops** read **Otus**.

" " " 29, " **pubescens** read **medianus**.

" " " 35, " **Ceophlæus** read **Phlæotomus**.

" 374, " 22, " **tzactl** read **tzacatl**.

" 348, " 34, " **Ampelis** read **Bombycilla**.

" 353, " 6, " **Traglodytes** read **Troglodytes**.

" 424, " 42, omit second **cærulea**.

" 610, " 35, for **carneiceps** read **carneipes**.

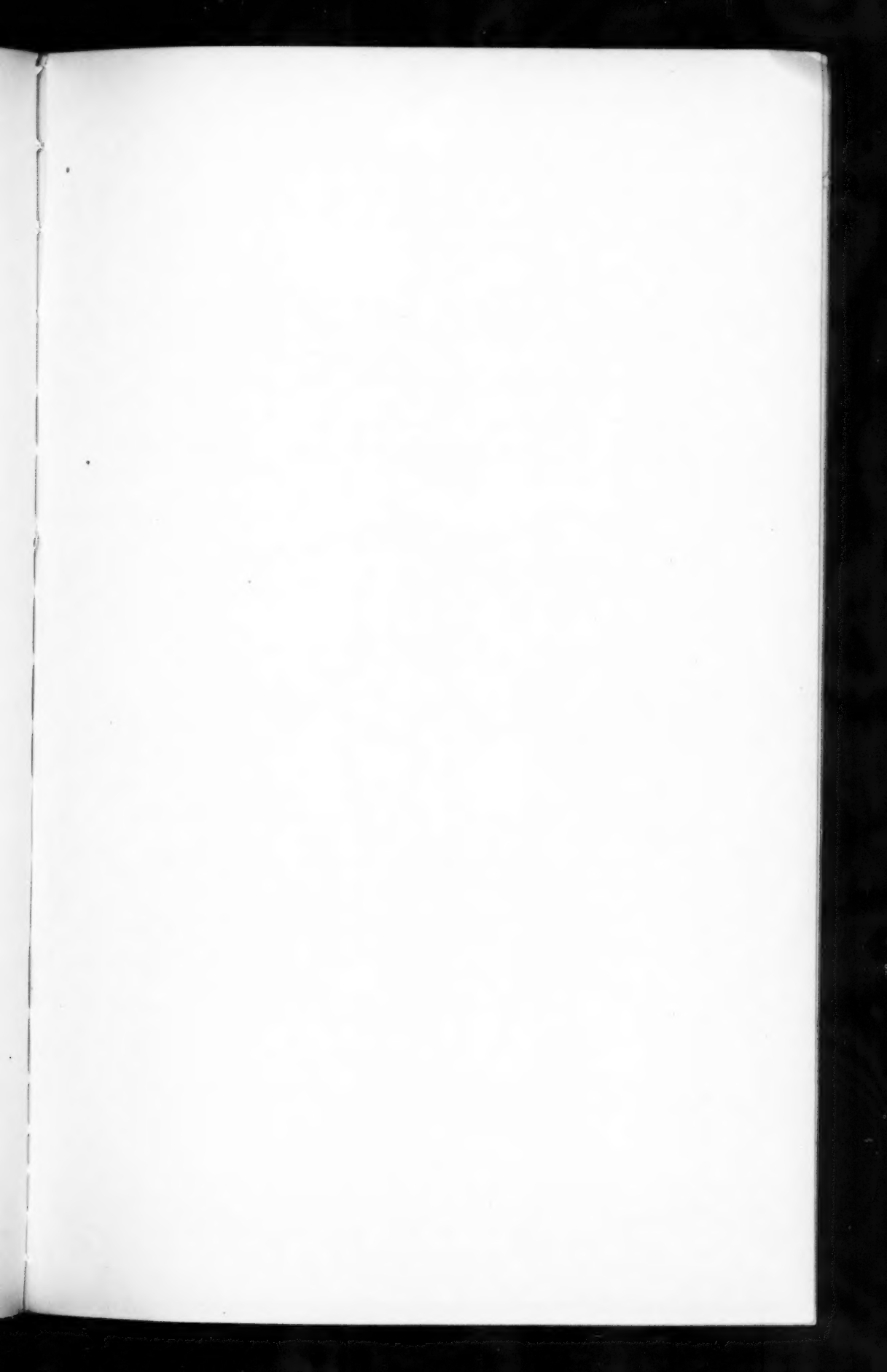
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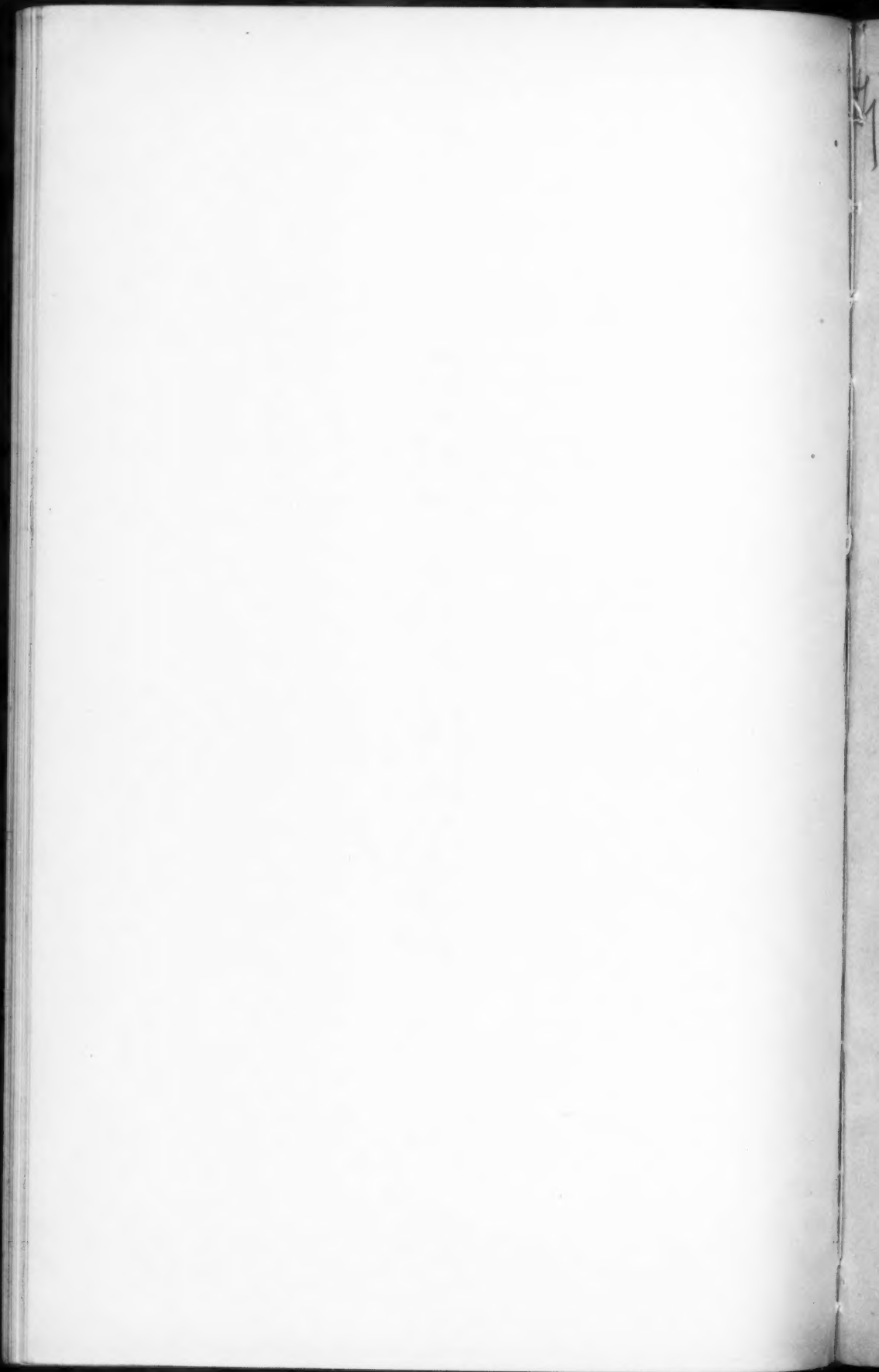
Vol. XXIX No. 4 — October 10, 1912

" XXX No. 1 — January 9, 1913

" " No. 2 — March 31, "

" " No. 3 — July 3, "





Old
Series,
Vol. XXXVIII

CONTINUATION OF THE
BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB

New
Series,
Vol. XX

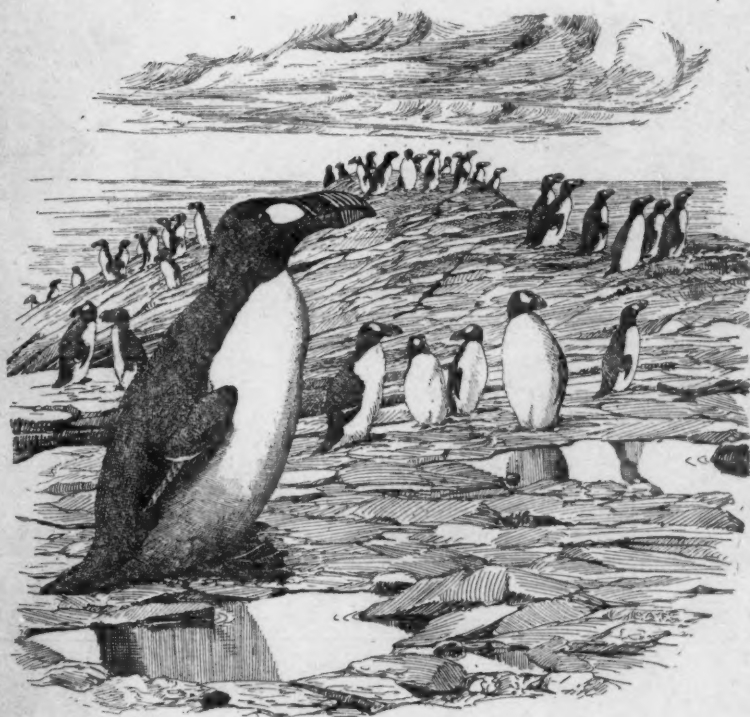
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The Auk

A Quarterly Journal of Ornithology

Vol. XXX OCTOBER, 1913

No. 4



PUBLISHED BY

The American Ornithologists' Union

CAMBRIDGE, MASS.

Entered as second-class mail matter in the Post Office at Boston, Mass.

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'THE AUK,' published quarterly as the Organ of the AMERICAN ORNITHOLOGISTS' UNION, is edited, beginning with the Volume for 1912, by DR. WITMER STONE.

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